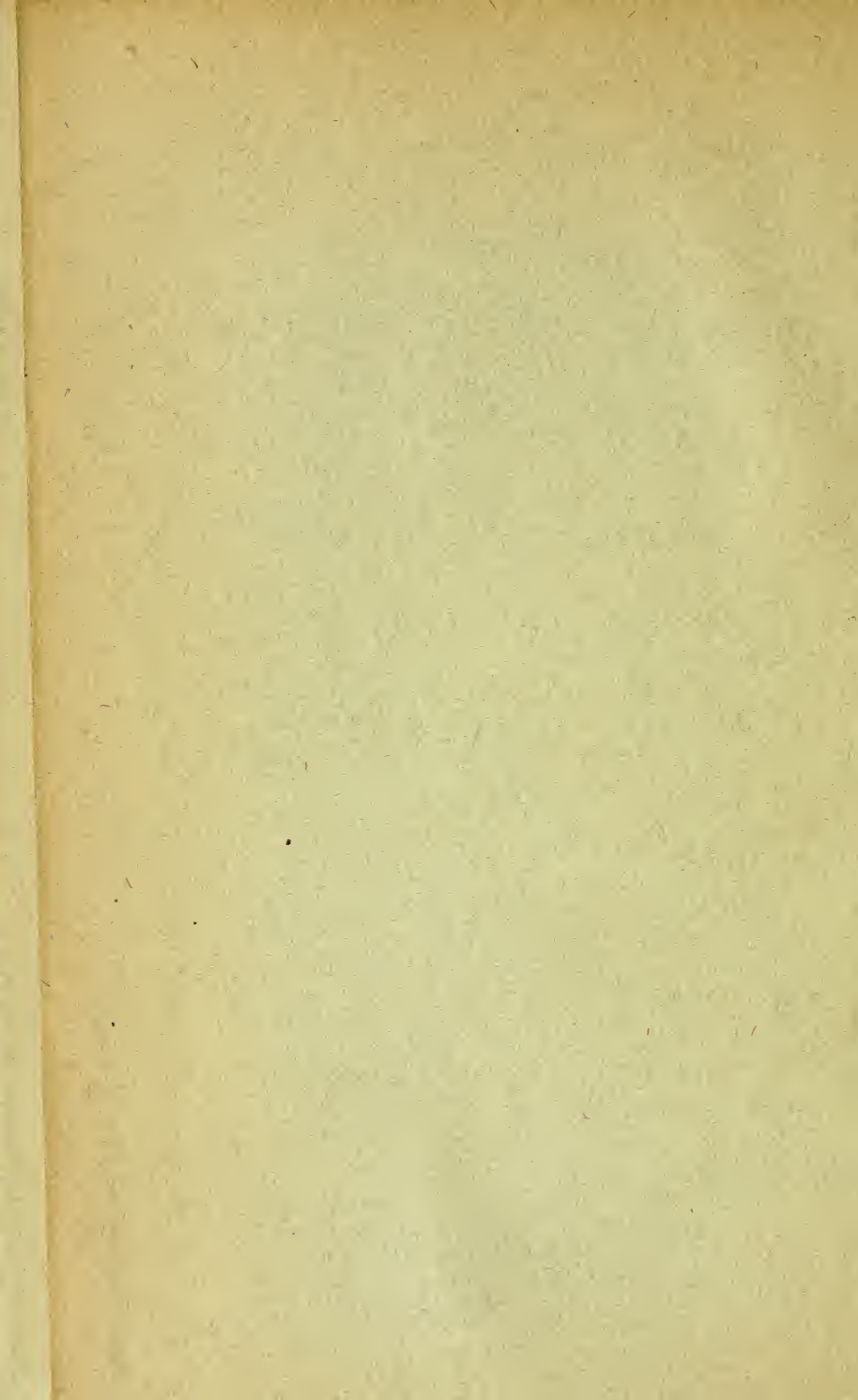




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ARIZONA

THE LAND OF

SUNSHINE AND SILVER

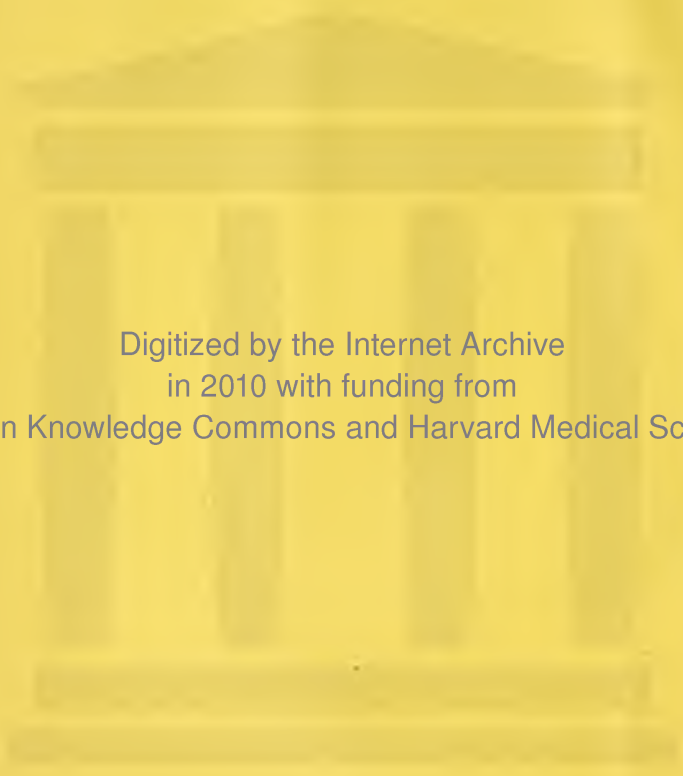
HEALTH AND PROSPERITY

THE PLACE FOR IDEAL HOMES

BY JOHN A. BLACK,

COMMISSIONER OF IMMIGRATION.

REPUBLICAN BOOK AND JOB PRINT,
PHOENIX, ARIZONA.



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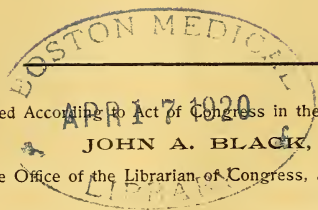
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ARIZONA.

SITUATED in the Southwestern portion of the United States, Arizona forms a part of the territory obtained from Mexico. The southern boundary was originally the Gila river (pronounced He-la), but by the terms of the Gadsden purchase the present boundary was established. The Territory extends from the 109th degree of longitude west to the Colorado river, and from 31 degrees 28 minutes north latitude to the 37th parallel. On the north it is joined by Utah and Nevada, on the east by New Mexico, on the south by the State of Sonora, Old Mexico, and on the west by California and Nevada. Having a mean length of 380 miles north and south and 350 miles east and west, the Territory is a vast empire in itself of 113,967 square miles, and equals in area the six New England States and New York combined; or again equals those three great States of the Mississippi Valley, Ohio, Indiana and Illinois.

In such a vast area all manner of climate, scenery and fauna can be found. In the fertile plains of the South grow all the semi-tropical plants, while the mountain peaks of the North are clad in perpetual snow. In no similar area of the world can there be found a greater abundance of grand and awe-inspiring scenery. Rugged mountains that rear their tall peaks above the clouds; broad plateaus whose grasses glisten in the sunlight; rocky gorges that mark the beds of streams which for untold ages have been slowly cutting their pathway to the sea; beautiful valleys which need but the magic wand of immigration to make them bring forth all the fruits of the earth; gigantic forests of evergreen pines; natural bridges beside which that famed wonder of Nature in the Shenandoah mountains pales into insignificance, and clear mountain lakes where

"One may rest and dream the hours away."

Here also may be found the ruins of the pre-historic ages. Ruins which had been long ago abandoned when Vasquez de Coronado first visited the Valley of the Gila, 350 years ago. Here in this great Territory may be found the ruins of the cave and cliff dwellers, those wonderful dwarfs whose homes were on the sides of bald and rocky cliffs, overlooking deep canons hundreds and even thousands of feet below. Here only can be seen the wonders of the Grand Canon of the Colorado, that great cleft in the mountains through which the mighty river

flows, with its banks rearing their perpendicular sides apparently to the skies, so high, indeed, that the visitor in the bottom of the gorge seems shut in in some vast cavern, where he can look above and see the stars in midday. And here only can the visitor see the greatest petrified forest ever found. Trunks of huge trees, some 40, some 50, some 60, some 70 feet to where the tops are broken off, all now turned to stone, and standing as mute monuments to the mighty forces of Nature that could produce these wonderful formations.

Although comparatively unknown by the mass of the people, Arizona was one of the first sections of country now forming the United States to be explored by the white man. When Alvar Nunez Cabeza de Vaca and his three companions made their wonderful escape from Indian slavery in Florida in the early part of the sixteenth century and made that perilous overland trip to Mexico, so graphically described in the old Spanish chronicles, they journeyed across the present Territory of Arizona from north to south. Their descriptions of the thrifty villages they had visited aroused new desires in the Spanish hearts of Mexico for further conquest and glory. Under the impulse of these reports Vasquez de Coronado fitted out an army of 1000 men and in April, 1540, set out from Culiacan to explore the unknown country to the north. He found many rich and populous villages, the inhabitants of which were mostly engaged in agriculture, but the precious metals, of which he was in quest, were not found. After two years of vain search for treasure the expedition returned to Mexico.

The first settlement in what is now Arizona was not made until 1687, one hundred and forty-five years after Coronado's expedition. Then two Jesuit missionaries, Fathers Eusebio Francisco Kino and Juan Maria Salvatierra established a mission at Guevavi, on the Santa Cruz, some distance south of Tucson. At about the same time the mission of San Xavier del Bac, about nine miles from the present city of Tucson, was founded. This latter mission is today one of the famous land marks left by the old Spanish fathers, and is well worth a journey of many miles to see. The old chapel was destroyed by the Apaches in 1751, the padres and most of the converts massacred, and for a time the mission was abandoned, but later the work was taken up again and about 1767 the present edifice was begun. It was never entirely completed, but so nearly finished that it forms a most imposing monument to the skill and patience of the mission fathers. For some years it has been greatly neglected, but recently efforts have been put forth by the Catholics of the Territory to restore it to its original beauty of three-quarters of a century ago.

Northern Arizona became a part of the United States by the treaty of Guadalupe Hidalgo in 1847, and through the Gadsden purchase of

1854 all that part south of the Gila river was acquired. It was a part of New Mexico for several years, and was finally created a Territory in 1863, Hon. John M. Goodwin being appointed the first Governor by President Lincoln. The first Capitol was located at Whipple. It was then removed to Prescott, where it remained until 1867, when it was taken to Tucson. Ten years later it was again removed to Prescott, and in 1889 it was removed to Phoenix, where beautiful grounds have been set apart for a Capitol building.

For years the very word "Arizona" has had a gruesome sound to the Easterner. At the mention of the name of this Territory visions of bloodthirsty Indians, white desperadoes, barren mountains and alkali deserts would spring before one's eyes. Recollections of the terrible massacres by Apaches along the old overland trail; of tales of men dying horrible deaths from thirst upon the desert; of stage robberies in the mountain passes, made the intending emigrant turn his steps in another direction. But a marvelous change has come, and there is no State or Territory in the Union today where human life is more sacred, where crimes are less frequent, than in this same Arizona.

With the advent of the Southern Pacific Railroad across Southern Arizona in 1878, and the Atlantic and Pacific across Northern Arizona in 1883, a new condition of affairs supplanted the old. The rustlers and highwaymen were brought to justice; the Apache was placed on reservations and warlike bands which broke away were hunted down and killed; the mountains, rich in precious ores, made to re-echo the sound of the miner's pick and the stamp mill. By aid of irrigation the sage brush plains were turned into waving fields of grain and orchards of golden fruit, until today no section of the Union offers better inducements to the laborer, the farmer, the orchardist, the capitalist and the invalid than Arizona.

Rich in mines, rich in timber, rich in grazing land, rich in soil for fruit culture, rich in the finest mineral springs on earth, rich in the purest of mountain air and perpetual sunshine, she offers every inducement for the home-seeker to come and establish here that ideal home which he has so long had pictured before him.

A conservative estimate of the wealth of the Territory puts it \$75,000,000. The assessed value for the year 1890 is but \$28,050,234.73, but it is a well-known fact that this represents only about one-third the actual value of the property. The following from the report of Acting Governor Murphy to the Secretary of the Interior is pertinent to this matter:

"I believe the system which is being practiced in Arizona of assessing property at a low valuation and consequently necessitating a high rate is exceedingly harmful and unwise. People seeking homes and

places for the investment of capital when told the rate of taxation are frightened, and naturally so, when an explanation is not afforded them. Nearly all the property in the Territory would bear a valuation double and in many cases treble the figures now stated. It is conceded by all who are acquainted with the facts that if all the property of Arizona were assessed, and at its full value, the rate of taxation would be as low here as in many of the most prosperous parts of the East. It is extremely desirable that the facts become known and understood so that the people in different parts of the country and the legislative branch of the Government may not be misled as to our condition."

It is not the intention of the author to take the reader's time with eulogies on Arizona or with dry statistics, but rather to present to him in concise form what has been done in the way of development in the various counties of the Territory and the advantages and possibilities for future progress.

APACHE COUNTY.

ENTERING Arizona from the east along the line of the Atlantic and Pacific Railroad the traveler finds himself in Apache County, which covers an area of 20,940 square miles. It is rich in natural resources and capable of sustaining many times its present population of only 5000. North of 35 degrees 30 minutes, and embracing two-fifths of the area of the County, are located the Moqui and Navajo Indian reservations. These Indians are peaceable and lead a quiet and comparatively industrious life. Their principal occupation is the raising of large herds of cattle and immense flocks of sheep, from which they receive a very considerable income, enabling them to live better than the average Arizona Indian. The Navajo blankets made by hand by the squaws of that tribe are justly celebrated as the finest blankets in the world. A peculiar characteristic of the Navajo male Indian is that the squaws are allowed to regulate all the commercial transactions appertaining to their handiwork, and to control to a very large extent the expenditure of the money resulting from the sale of their goods.

The Government, appreciating the pacific inclination of the Moqui Indians, is about to sub-divide 275,000 acres of their reservation into forty acre lots, whereon the Indians are to be located and allowed to utilize these tracts in severalty. This wise plan adopted by the present administration has been eminently successful on other reservations, especially so on the Papago reservation in Pima County, where the Indians gladly avail themselves of the privilege accorded by the

Government of independent ownership of land. This scheme it is believed will be far-reaching toward making the Indians more self-reliant and industrious, and its tendency toward severing tribal relations will be a strong factor in promoting peace among Indians whose natural inclinations under the old community interests in property were to neglect the land and devote a large portion of their time to wandering and mischief.

The Central and Southern part of the County is drained by the Little Colorado river, which rises in the White mountains and flows in a northwesterly direction until it empties into the Big Colorado. Tributary to the Little Colorado are the Cottonwood and La Roux creeks and the Rio Puerco, which drain that part of the County north of the Atlantic and Pacific Railroad, a high rolling prairie country. The soil as a rule is of a rich sandy loam, peculiarly adapted to alfalfa, and covered with good grass and white sage, which makes excellent feed for stock. In the valleys of Cottonwood creek and La Roux wash large bodies of land might be cultivated by means of reservoirs. The Zuni river empties into the Little Colorado river southeast of the Rio Puerco and drains a high rolling grazing country well timbered with pine and cedar. The tributaries of the Little Colorado on the south and east are nearly all living streams of fresh mountain water. They are Nutrioso creek, Coyote creek, Concho creek, Show Low creek, Silver creek, Chervalon's Fork, Clear creek and Carizo creek, and supply water for the numerous prosperous settlements throughout this section. In the White mountains is as fine natural scenery as can be found in any mountain range in America. Blacktailed deer, antelope, bear, mountain lion, grouse, wild turkey, etc., etc., are to be found in large numbers, while the mountain streams are filled with trout. Here the sportsman can gratify his every inclination, whether it be with rifle, shotgun or rod. That the reader may have some idea of the immense watershed contained in a small portion of the mountains, it will be sufficient to say that within a radius of twenty-four miles the circle would cut the head waters of the Little Colorado river, Black river, White river, Salt river, San Francisco river, Blue creek, Nutrioso creek and Stone creek, all of these being living streams with their numberless pure, cold spring tributaries cutting their way through beautiful parks and valleys, deep canons and gorges, with here and there a sparkling lake fed by springs, together with the vast pine forests and valleys combine to make up as grand and picturesque mountain scenery as can be found on the continent.

The principal industries of Apache County are sheep and cattle raising and agriculture. The County is peculiarly adapted for the successful raising of sheep, and is at present the largest producer of wool in the Territory. A conservative estimate of the product during the past

year is given at about 2,000,000 pounds, and the number of sheep grazing in the mountains and in the valleys is estimated at about 300,000. The sheep industry is in an exceedingly flourishing condition, and the grade of sheep is being yearly improved.

The cattle industry is also in a prosperous condition. For the year ending June 3, 1890, about 12,000 head were shipped East, and there are now on the ranges about 250,000 head of an excellent grade.

From Navajo Springs, on the Atlantic and Pacific, stretching west for a distance of forty miles, in width averaging from two to eight miles, lies the Puerco Valley, consisting of excellent agricultural land. A feature recommending it to settlement is the fact that water can be had in abundance at from five to fifteen feet from the surface, making an irrigation pump system perfectly feasible and recommending it to those seeking profitable landed investments. Other valleys lying along Carizo creek, Dead Man's creek, and Lithodendrun creek, north of the railroad, offer equal inducements to agriculturists.

Settlers are beginning to appreciate the value of these valleys for agricultural purposes and are rapidly populating this favored section, 2500 acres now being in successful cultivation around Holbrook. On the south side of the Little Colorado, from Holbrook west, a valley extends for fourteen miles, from one to eight miles wide, of first class agricultural land. Pumps or ditches from the Little Colorado can be utilized for reclaiming this land. Government land can be had here at \$2.50 per acre, and can be made to yield profitably on a valuation of \$50 per acre. Proceeding west from Holbrook a distance of twenty miles we reach the Little Colorado Valley, ten miles wide by fifteen miles long. This desirable land is watered by the Little Colorado, Clear creek, Chervalon's Fork, while natural springs abound. Cattle range over the country at present. Hay raised in the neighborhood of Holbrook sells at \$20 per ton. Desirable reservoir sites exist in the mountains, where large quantities of water can be stored for irrigation purposes.

PRINCIPAL CITIES.

St. Johns, the County seat, is situated about fifty miles south of Navajo Springs, on the Atlantic and Pacific Railroad, at an altitude of 5700 feet, and has a population of about 1200. St. Johns was first settled by the Mexicans from the Rio Grande in 1872. The Mormons began the settlement of this section in 1882, a "stake" being established at that time under the leadership of Ammon M. Tenney.

The number of acres of agricultural land in and around St. Johns is 7500, and the product is small grains, alfalfa and vegetables. A number of orchards planted several years ago are now bearing excellent

fruit. During the past two years at least 10,000 fruit trees and vines have been set out, and in a few years the quantity of fruit raised in and around St. Johns will be an important item in the products of the County. The principal fruits are peaches, pears, apples and grapes, and only the choicest varieties of these have been planted. This fruit is remarkable for the delicious and juicy flavor. Bee culture is also engaged in with success. The water used in the irrigation of these lands is taken from the Little Colorado river by means of canals and ditches aggregating twenty miles in length. There is plenty of additional land available for cultivation, and the facilities for the storage of water have been assisted by nature to such a degree that a number of sites near St. Johns could readily be made into substantial reservoirs or dams at little expense. The St. Johns Irrigation Company's reservoir is situated about one and one-half miles above St. Johns, covering fifty-five acres of ground, with an average depth of twelve feet of water, and smaller reservoirs supply water for some of the smaller ditches. A new patent roller flouring mill has just been erected which will produce a large quantity of the flour used in this section.

Springerville, in Round Valley, thirty-five miles southeast of St. Johns, at an altitude of 6500 feet, has a population of 900. It is the most flourishing settlement on the Little Colorado. Over 5000 acres of good agricultural land are now under cultivation, the principal products being grain, alfalfa and vegetables. The settlement is noted for fine quality of grain raised, especially oats. The black oats grown here average forty to forty-five pounds to the bushel. The water for irrigation purposes is obtained from the Little Colorado river, and is distributed by means of ditches aggregating about twenty-five miles in length. Becker lake or reservoir retains a large quantity of water which is used for irrigation purposes. It is one of the finest bodies of water in Northern Arizona, being one and one-half miles long by one-half mile wide and twenty-five feet deep. This reservoir is filled once a year from the mountains. Large quantities of carp and trout afford excellent fishing. The White mountains are distant from Springerville about fifteen miles, and the military post of Fort Apache about twenty-five miles. This is a three company post, is regimental headquarters, and affords a market for a large part of the surplus grain and hay produced around St. Johns and Springerville.

Nutriosio, fifteen miles southeast of Springerville, has about 2000 acres under cultivation. A reservoir retains the water from Nutriosio creek, which is distributed by ditches eight miles in length. Other reservoirs are now being constructed, which will irrigate a much larger body of land.

Alpine, ten miles southeast of Nutrioso, has 2000 acres of splendid agricultural land under cultivation, which is irrigated from springs and from Alpine creek, but as the altitude here is about 9000 feet, the land requires little irrigating, the rainfall being nearly sufficient for the raising of crops of oats, barley and wheat.

Concho, situated fifteen miles west of St. Johns, on Concho creek, has a population of about 600. This point is headquarters for sheep men whose ranges are in this section. About 1200 acres are under cultivation, and water for irrigating purposes is supplied from a reservoir which is filled from Concho creek. A number of orchards containing peaches, pears, apples, plums and grapes are in a healthy condition and are bearing well. A ready market for the fruit is had at St. Johns. The principal product of this entire section is grain, alfalfa and vegetables. The farmers generally are supplied with the latest improved agricultural machinery, and their farms present an appearance of thrift and prosperity.

Show Low, on Show Low creek, is located about fifty miles from Holbrook and three miles from Taylor. It is the principal rendezvous for the larger sheep and cattle men in this section of Apache County, whose ranches are located in the White mountains and on the head waters of Show Low creek. In the neighborhood of Show Low about 1000 acres are successfully cultivated by irrigation from the water of Show Low creek. As yet the raising of fruit has received no attention in this locality, but the altitude and the character of much of the soil promise a successful cultivation of the hardier varieties of fruits.

Pinedale is a small settlement of about 150 population, situated thirteen miles northwest of Show Low. One thousand acres of land are cultivated in and around this settlement, the products being principally grain and garden vegetables. Though orchards have in some instances been set out, but not for a sufficiently long period to give a satisfactory statement of the results, there is little doubt, however, that the efforts of the pioneers in fruit culture will result successfully, as the climatic conditions are favorable and the soil is well adapted for the undertaking.

Taylor is favorably located on Silver Creek, forty miles southeast from Holbrook, and has 1500 acres under cultivation. A good system of ditches taken from Silver and Show Low creeks furnishes the water. The junction of the two streams is just above the town, and the water supply is ample for the requirements of the neighborhood.

Snowflake is well located on Silver creek and has a population of about 600. Fifteen hundred acres of land have been put in crops and well watered from Snowflake creek and the Taylor canal, the

dimensions of the latter being five feet wide by two feet deep. Snowflake is a desirable residence site, and its present meagre population will be largely added to at a very early day. Two story brick buildings and fine orchards are features of the town. The grain facilities justify a first-class grist mill. At present a small flouring mill seven miles above Snowflake is utilized by the farmers and answers immediate purposes. Fruit, vegetables and alfalfa are raised in abundance, alfalfa selling at \$8 per ton. The town also possesses a tannery, and the growth of oak for tanning purposes is prolific in this vicinity. An excellent quality of leather is made, and the supply of the County is largely derived from this local tannery. At Nutrioso also there is a tannery which has recently been started and promises to meet with success.

Woodruff, at an altitude of 5300 feet, is desirably located twelve miles southeast of Holbrook, on Silver creek, and comprises about 250 people. Seven hundred acres of good land are carefully cultivated and irrigated by small ditches taken from Silver creek. For the purposes of irrigation a dam has been constructed just above the town, thirty-five feet high and 250 feet wide at a cost of \$15,000. While this dam has been washed out, the people persevere in its reconstruction, the land, in their opinion, justifying larger outlays of money for its maintenance. Its present status justifies the hope that its permanency is assured. The chief products are wheat, oats and corn, while vegetables sufficient for home consumption and considerable for exportation are raised. Eleven squashes raised in rich soil at Woodruff yielded a gross weight of 339½ pounds, while watermelons weighing fifty pounds are a common product. Fruit such as currants, raspberries, gooseberries, grapes, peaches, apples and plums do remarkably well. The city of Holbrook furnishes a market for much of the fruit.

Holbrook is situated on the Atlantic and Pacific Railroad and on the Little Colorado river, at an altitude of 5072 feet, and has a population of 500. The mercantile establishments of Holbrook do a flourishing business, and two hotels furnish good accommodations for guests. Being a general supply point for a large portion of the County, business of all kinds is conducted to meet the demands. A large number of cattle and sheep are annually shipped from this point, it being the center of a district largely devoted to grazing, while supplies for Fort Apache, in the southern part of the County, are freighted by teams from the railroad at Holbrook to the amount of 3,000,000 pounds per year, as are also supplies for Pleasant Valley, in Gila County. Surrounding Holbrook is as fine agricultural land as can be found elsewhere in the Territory, and three irrigations a year are deemed sufficient for the raising of crops. In the mountain table lands forty-five miles south of Holbrook is a larger area of agricultural land that will grow the several

varieties of grain and give a large yield of vegetables without artificial irrigation. It is a noticeable feature of this locality that the great pest of the Eastern farmer—the potato bug—has never put in an appearance here.

St. Joseph, ten miles west of Holbrook, has a population of 125 and has 1000 acres of land under cultivation, watered by a ditch about eight miles long, the water being taken from the Little Colorado river. Farming and stock predominates. Wheat, corn and vegetables are raised, while a small amount of this land is devoted to alfalfa.

Winslow, on the Atlantic and Pacific Railroad and at the western line of Apache County, has a population of about 400, and is headquarters for this division of the Atlantic and Pacific Railroad. The railroad company have here a round house, machine shops and car repair shops, and in all branches employ about 125 men. Winslow is also the shipping point for cattle, sheep and wool from the western portion of Apache County and a part of Tonto Basin, in Gila County. The soil around Winslow is of excellent quality, but the development of water has not been perfected to the extent of being able to do much in an agricultural way. Clear creek, six miles from Winslow, supplies water for the town and the railroad company, and is brought there by means of pumps. A dam and ditch now partly constructed will furnish additional water for this point and have a large supply for the irrigation of lands immediately surrounding Winslow.

A feature worthy of special mention in regard to Apache County is the wonderful deposits of coal to be found within its boundaries. In the northern section of the County about forty miles north of Holbrook and Winslow a large deposit of coal is to be found, which extends into the Moqui Indian reservation. In the eastern portion of the County, commencing at a point about ten miles east of St. Johns, at 34 degrees 30 minutes north latitude, extending north and west for sixty miles, is an immense coal deposit, believed to be the continuation of the Gallup coal fields of New Mexico. In the southern portion of the County, south and west of Show Low, is another large deposit, extending south into the White Mountain Indian reservation. This coal is a good quality of soft or bituminous coal, and if developed will be found almost inexhaustible in extent and supply.

YAVAPAI COUNTY.

YAVAPAI County's Board of Supervisors in the early part of 1890, offered a cash prize for the best essay on the county, showing its resources and possibilities. Of the different papers presented, that of W. L. Van Horn, of Flagstaff, was considered the best and through the courtesy of the Supervisors, I am permitted to draw from it for a description of the "giant" county.

Yavapai County is not the "earth," but it is a goodly part of it. Locked up in its hills is a large percentage of the world's mineral wealth. Its climate is unrivaled; its people progressive; its soil fertile; its capabilities as yet unmeasured and not thoroughly realized. For homes, for health, for wealth, it is unexcelled. Lying between the thirty-fourth and thirty-fifth parallels of latitude, and between 33 degrees 40 minutes to 36 degrees 20 minutes west longitude from Washington, with elevation ranging from two to near thirteen thousand feet, we find quite all the diversity of climate, products and vegetation from the torrid to the frigid zone. One of the four counties into which Arizona was first divided at organization, it has been called upon to give up part of its great original area, first in 1871, to help form Maricopa County, next in 1875 to Pinal County, and later in 1879 for the organization of Apache County. Before the last Legislature, in 1889, took out an eccentric gash in the southeastern corner for the benefit of Gila County, our area was estimated at 30,015 square miles—now it is 29,050 square miles. Of this vast area, as large as New Hampshire, Vermont and Massachusetts together, something like 15 per cent. only, or about 130 townships, is surveyed.

Within the limits of an article like this, with the objects in view, and without a map, it is impossible to discuss the geographical features of the county except very meagerly. A line drawn from where the Atlantic and Pacific railway intersects the western boundary of the county to the southeastern corner at the "rim" of the Mogollon mesa, would be very nearly the dividing line between the plateau regions to the north, and the Sierra regions to the south and southwest. The whole northern and northeastern part of the county, the larger part, in area, is part of the immense Colorado plateau. Through it cuts that stupendous gorge, the Grand Canon of the Colorado, with the Little Colorado, Cataract and Kanab Canons coming in. To the south and southwest lies the Sierra region, broken up into mountain ranges with their outlying foot-

hills all containing countless mineral wealth, while between and about are noble grazing parks and agricultural valleys. In this region we find flowing to the south the Hassayampa and Agua Fria rivers, with very many important tributaries, the Santa Maria flowing to the west, with a large drainage area, while the Verde river, for the major portion of its course, is near the division line between the plateau and Sierra regions, and receives many noble streams from both sides.

Superimposed upon the plateau structure we find some few volcanic cones, as in the San Francisco mountains, the highest in Arizona, and which reach at their best an elevation of 12,794 feet above sea level. In the eastern part, near the southern line of the plateau, the Mogollon reach off into Apache County. In the Sierra regions the Verde hills or mountains border the Verde river on the west, forming the water shed between the Verde and Agua Fria rivers, extending to the northwest into the Black Hills, with Cherry creek separating them. The Mazatzal mountains form part of the southeastern boundary, with Gila County on the opposite slope. The Sierra Prieta run through the central portion near Prescott, beginning with Granite Mountain on the northwest and ending with Mount Union on the southeast, but thence continuing under the name of the Bradshaws. The Juniper mountains run into the northwest to the west of Chino Valley. The Santa Marias lie to the west and northwest of Granite Mountain, forming the source of the Santa Maria river, on the south bank of which, near the western boundary, lie the Kendrick mountains. To the southeast from these mountains stretch the Weaver mountains to the Hassayampa river, while still further into the southwestern corner of the county, forming the barrier against the low, desert country beyond, lie the Date Creek or Martinez mountains. Mount Union, rising to an elevation of 8000 feet, twelve miles to the southeast of Prescott, is a sort of universal water shed, and withal auriferous, as every stream finding its sources there has furnished placers successfully worked for all times since their discovery. From its northern slope flows Lynx creek to the north, east and southeast; Big Bug creek starts from the eastern slope to the northeast and then southeast, while from the southern slope Turkey creek flows to the southeast, all reaching the Agua Fria. From the southwestern slope starts Milk creek or Crook Canon, to reach the Hassayampa, which finds its own source on the northwestern slope. Granite creek, too, comes from the northwestern slope. All these mountain ranges have a northwest and southeast trend, all contain valuable mineral deposits, all have fine grazing and excellent wood, all give rise to flowing streams of pure mountain water, and between them lie fertile agricultural lands.

Prescott, the County seat and former Territorial Capital, is situated in latitude 34 degrees 30 minutes north, and longitude 112 degrees

28 minutes west Greenwich, at the foot of the Sierra Prietas, about midway of their course, with an elevation of 5600 feet, and is the present terminus of the Prescott and Arizona Central Railway. It has a population of 1843 by the present census, has two live daily newspapers, excellent public schools, ample water works, a fine city hall, first rate county buildings, electric lighting of high quality, five church buildings, with other denominational societies not yet holding separate church property, four very efficient fire companies, a militia company, secret and benevolent societies, a well managed city government and a fine all-the-year-around climate. On the Atlantic and Pacific Railroad is situated Flagstaff, at the foot of the San Francisco mountains, with an elevation of 6984 feet, having two weekly newspapers, two church buildings with three church societies, a reading room and library, excellent school accommodations, a militia company, a hook and ladder company just organized, five secret societies, etc., etc. Williams, another important Atlantic and Pacific station, thirty-three miles west of Flagstaff, at about the same elevation, has a population estimated at 280 by the last census, and is a thriving town. To mention all the other settlements in detail would exhaust the space at command, and we can only say that all are growing, thriving communities, all are progressive, wide awake to improvement and earnest in securing educational facilities.

Across the northern part of the County, having a mileage within the county of 167,212 miles, runs the Atlantic and Pacific Railroad, part of the extensive Santa Fe system, stretching from Chicago to Los Angeles and San Diego. Over it two passenger trains pass daily each way. I have not been able to obtain full traffic statistics, but learn that from Flagstaff for the six months ending June 30, 1890, there were shipped 855 carload lots, of which 5 were vegetables, 1 was horses, 16 wool, 18 merchandise, 2 hides, 312 stone, 71 cattle and 430 lumber. This, too, for the lightest shipping half of the year, and July shipments of wool and cattle would double the number. From Bellemont went hundreds of tons of ice, and from all stations wool, sheep and cattle. From Williams alone (including Ash Fork shipments billed at Williams) went 95 cars of cattle in the same period, and up to August 15th the cattle shipments were increased to 230 cars. From Flagstaff south reaches out the Central Arizona Railway, formerly the Mineral Belt Railroad, with a length of thirty-five miles, now operated mostly for hauling lumber and timber; some freight is carried also. Among other things there were shipped over it several cars of mining machinery and merchandise for the Tonto Basin. Much wool, too, is handled, fully 20 cars for the past year. The present company is straining every nerve to forward its construction to Globe and to Phoenix, having made thorough surveys to Payson, 116 miles, already for construction.

Thence to Phoenix by preliminary surveys is an easy line of only 86 miles. For 75 miles to Baker's Butte, it traverses a magnificent timber belt of pine, spruce, cypress and maple. From this timber, which it will bring within 125 miles of Phoenix, it breaks at once into a well developed mineral country, only awaiting transportation facilities to make a paying traffic from the first. It will make a fine scenic line, descending from the Mogollon mesa through Fossil Creek Canon, with almost vertical walls of 2600 feet in height and reaching within two miles of the Natural Bridge.

The most important road entirely within the county is the Prescott and Arizona Central Railroad, with a length of 73.3 miles, coming down through the vast Chino Valley to where Little Chino comes in, thence up it and Granite creek to Prescott, which it connects with the Atlantic and Pacific at Prescott Junction. From Garland station go the immense shipments of the great Hillside mine; from Chino, Ross and Banghart thousands of cattle; from and to Verde Junction the coke, merchandise and copper matte of the United Verde Copper Company, and from and to Prescott extensive ore and merchandise shipments. I have been able to obtain only a summary of the Prescott shipments. For 1889 the ore exports were 4,612,000 pounds, and for the first half of 1890, 1,630,000, the first half of the year being always the lightest. Of stock in 1889 there were exported 148 carloads, carrying 4,500,000 pounds, and in 1890 (remembering always that when the year 1890 is mentioned herein there is meant only the first half of the year), 53 carloads. The imports of merchandise during 1889 were 4,209,000 pounds, and for 1890, 2,292,000 pounds, the total freight handled during 1889 amounting to over forty million pounds. The further construction of this road to meet the Phoenix and Maricopa Railroad in the near future is assured, and that the road will pay from the start is undoubted. Banding together the two great through lines crossing the Territory, it will closer unite the north and south parts of the Territory, will make available prodigious mineral wealth now lying fallow awaiting railroad facilities and cheapen the necessities of life for all. Competent engineers are completing through surveys, plats and field notes of the line preparatory to construction.

The records of the United States Land Office at Prescott, for the Northern Land District, comprising the Counties of Mohave, Apache, Yavapai and parts of Gila, Maricopa and Yuma, being all the country to the north of the first standard line north, show a constant increase in the amount of lands passing from the public domain into private ownership. For convenience we classify the entries in three different periods of six months each, ending respectively—

	1889. June 30.	1889. Dec. 31.	1890. June 30.	Total
Pre-emption Filings—				
Full District.....	30	25	56	109
Yavapai County.....	23	18	45	86
Yavapai County Acreage.....	3720	2760	6860	13340
Homestead Filings—				
Full District.....	19	18	23	60
Yavapai County.....	13	12	11	36
Yavapai County Acreage.....	1996	1920	1280	5196

During the same period, out of 29 final pre-emption proofs in the District, 15 were of this County, and out of 49 homestead final certificates issued, 25 were to this County. Nor are the mining interests to be overlooked, for within the same period, out of 41 applications for mining patents, 40 were from this County, and the whole number of mining patents issued—21—were to this County. The total acreage filed on for the County during the year and a half was 18,536 acres—a good showing for what is generally thought to be a desert country.

Since the census of 1880, when we had a population of 5013, we have had a steady, even increase of progressive, energetic Americans. All industries have shared in the advancement, and our present population, by the recent census, is 8499, exclusive of Indians. Of this number, 276 are veterans of the civil war or the war with Mexico. Only 100, or about 1 per cent., are permanently afflicted with disease; and the census enumerators report only 25 deaths for the preceding year. To keep this population in health, there are only eight physicians in all the County, or less than one to every thousand souls. While all are doing fairly well, only those who have outside investments are appreciably making money, and surgery forms a large percentage of the practice. Nor is there need for more physicians. A more convincing argument for the healthfulness of our climate would be hard to find.

CLIMATE.

Our climate needs no encomiums, and speaks for itself. Disease is rare, and with all the exposure our stockmen and miners endure, a hardier, stronger and more robust people it would be hard to find anywhere. Sunstrokes, cyclones and heavy wind storms are totally unknown. Our dry, pure air is highly oxygenated, and gives an impulse to life that makes one a new man, compelling him to healthy action. With fine, warm days come cool nights, conducive to restful slumber. No matter how hot the day may be in the sunlight, a step into the slightest shade finds a delicious sense of coolness decidedly invigorating. We have neither the cold, with moisture, breeding fatal pulmonary troubles, nor the moist-hot malaria climate found elsewhere. With the first opening of the Verde Valley (as always accompanies the turning

over of new soil in quantity), there were some little malarial troubles, but that has long since passed away, leaving that fruitful valley free of disease, as all the rest of the County. The thin, rarified air of low barometric pressure necessitates quicker respiration, enlarging the chest and bringing the lungs into full action, and the blood bounds with vigor, giving life a newer, fuller meaning.

All over the plateau regions snows fall, sometimes to great depth about the higher mountains, but in the lower valleys snow is rarely seen, save on the distant hill and mountain tops. And even at the coldest of the elevated regions there is not felt the same discomfort in our dry cold, as in the damp cold of even temperature elsewhere. Though the summer rains of July and August are sufficient for grazing purposes, sunshine rarely fails a day. Even in the plateau regions, where the rain supply suffices for agricultural needs, and at the mountains, where rains fall in abundance daily, in season, no day is without its sun shining full and free, not merely "behind the clouds." Not being able to obtain reports from all the Signal Service stations, we can only take Prescott, as it is a fair representative for the whole County in average. For the year 1889, and up to June 30, 1890, the mean temperature and total precipitation for the different months were:

	Mean Temperature.		Total Precipitation.	
	1889	1890	1889	1890
January.....	28.4	32.9	1.73	2.29
February.....	34.2	39.2	1.35	3.02
March.....	44.0	45.2	2.91	1.52
April.....	53.4	51.6	.19	.86
May.....	59.2	59.2	....	....
June.....	66.6	63.6	.02	.06
July.....	74.6		1.45	
August.....	73.4		1.51	
September.....	63.6		2.11	
October.....	54.4		1.76	
November.....	42.8		.42	
December.....	42.2	(including snow)	7.38	

For 1889, the mean barometer was 24.74; highest, 25, on November 9th, and lowest, 24.14 on February 14th. For 1890, the highest barometer was 25.043 in March, and lowest, 24.381 in the same month. Of cloudless days, there were 192 in 1889, and 118 for 1890. Of cloudy days there were, respectively, 68 and 28 days; of partly cloudy days, 105 and 35, and of rainy days, 75 and 25 days, respectively. There were no foggy days in either year, nor any auroras. There were 37 thunder storms in 1889, and for the same year the heaviest wind was at 60 miles per hour from the southwest on February 3d and 5th. In 1889 the highest temperature was 100 degrees on July 3d, and the lowest, 8 degrees on January 20th. In 1890 the highest was 88 degrees on June 29th, and the lowest, 3 degrees on January 12th. The snow fall for 1890

was 10.5, distributed thus: In January, 5.5; in February, 4.0; March, 0.9, and April, 0.1. The mean temperature for 1889 was 53.1, and the mean daily range of temperature was 27.6; the total precipitation, 20.83. The rainfall will average, and does average, more than the famed citrus regions of Southern California, and is constantly increasing with the passing of years and growth of population.

TIMBER RESOURCES.

Among other things in which Yavapai County is first in the Territory are her forests. Covering an acreage estimated all the way from 5,000,000 to 7,000,000 acres of valuable lumbering forests, it follows that the cutting of timber is an important industry. The lordly pine grows at an elevation of 7000 to 10,000 feet above sea level, as high as 200 feet, sometimes without limbs to 100 feet, reaching a diameter as great as 5 to 6 feet. With a small break in the Coconino Basin, the forests extend from the northwestern corner across the Grand Canon in a southeasterly direction over into Apache County and New Mexico. For fifty miles across the timber belt the Atlantic and Pacific Railroad winds through this excellent forest, interspersed with beautiful glades and parks of fine grazing and agricultural land. Pine is the principal commercial timber, and houses are nicely finished by simply combining and alternating the different shades, using no paints or colors, but finishing with oils in the natural tints. And generations will not suffice to use up the forests of pine as they stand, without allowing for the young timber constantly springing up. Spruce is another commercial wood in great demand, and which is found all through the pine regions at 7000 to 8000 feet elevation, the largest belt of spruce being found in the neighborhood of Baker's Butte. The junipers, red and yellow, growing at 4500 to 6000 feet elevation, are susceptible of a fine polish, and make beautiful finishing woods. Just over the "rim" of the Mogollon mesa and verging into Tonto Basin is found much cypress, a very valuable and useful wood. All the lumber and timbers used in and about the Grand Prize mine are of this wood. About Baker's Butte, and in many other parts of the County, is found maple of different varieties, excellent for furniture and domestic purposes. Scattered in different portions over the whole range of the County are found walnut, ash, oak, hickory, sycamore, willow, alder, manzanita, cottonwood, quaken asp, mesquite, cedar, wild cherry, locust and iron wood, each of no small value or utility, and each in sufficient quantity to form a very considerable portion of our latent wealth and capabilities. The mining regions of the County look first to the timber resources of the Sierra Prieta and other ranges for their needed timbers and lumber. And the different sawmills in and about Prescott have been and are sources of profit to their owners, and a benefit to the whole country—the mill of Clark & Adams alone having cut a million feet during the year ending

June 30, 1890. During 1889 the mills of Bashford & Burmister cut a half-million feet. The Hillside Mining Company have their own mill to cut the timbers needed for the mine. Phelps, Dodge & Company have a mill in Copper Basin to supply their different properties; the United Verde Company runs its own mill, and the Big Bug country is largely supplied from Van Name's mill.

But it is to the great pine regions of the plateau country that we must look for the larger lumbering enterprises. The Arizona Lumber and Timber Company, with headquarters at Flagstaff, keeps on hand a stock of about 5,000,000 feet of all grades and kinds, that company turning out a greater variety of lumber in all forms than any mill west of the Mississippi until California and Oregon are reached. They average an export of nearly four cars per day the year round, and of fully five cars per day for the working season, April to December. They have four mills in running order, and another one ready to be put up this season, making a total cutting capacity of 175,000 feet per day. Their Mill No. 1, at headquarters, combines with it a planery of 125,000 feet capacity per day, putting out all kinds of fancy work, moldings, scrolls, turned material, etc. Within the last year and a half they have cut over 17,000,000 feet. They employ about 200 men, whose pay runs from \$45 to \$90 per month. The company owns a tract of 320 acres immediately adjoining Flagstaff, and has built up quite a community of houses for lease to employees. Milton, as the village is called, may be said to be the only temperance town in the County; possibly, in the Territory, as the company will not part with a foot of its soil nor allow liquors handled or sold on all their lands. Though commencing in 1881, they have as yet made no appreciable inroads upon the forests.

BUILDING STONE.

A prominent industry of the County and one little known or appreciated even by those residing in its vicinity is rock quarrying. While excellent building rock is found in all parts of the County, it is only at Flagstaff that anything like extensive work is done. In the eastern part of the County are great beds of sandstone, 1500 feet in thickness in places. The Aubrey cliffs, in the northern part of the County, are largely made up of excellent sandstone, varying in color from white to dark red, having a fine grain texture and great strength, and which has been used by the Atlantic and Pacific Railway in erecting the piers for the new cantilever bridge across the Colorado river at the Needles. A company has been formed to work these deposits, but the great hardness and consequent heavy expense in quarrying and cutting the rock retard development. But from the quarries of the Arizona Sandstone Company, opened in 1887 near Flagstaff, is taken a fine pinkish sand-

stone, equaling the famed Connecticut brownstone in beauty, texture and crushing power. Polished it makes fine looking mantel ornaments, gravestones and monuments. Though worked with comparative ease, it hardens on exposure to the air and withstands well all climates and weathers. Shipments are made as far east as Kansas City, and among other buildings wholly or partly erected from it may be mentioned the court house and city hall at Los Angeles, the academy of science at San Francisco, Brown's hotel, the Boston block, several clubs and residences at Denver, business blocks and residences at Pueblo, Kansas City, Dallas, Texas, San Diego and Santa Ana, Cal. Fifty men are constantly employed, and all modern appliances are used, including steam drills, patent reamers, steam derricks with a lift of thirty tons each, and electricity for discharging shots where several blasts are made at once. Cars are loaded direct by the derricks on side tracks of the Atlantic and Pacific threading the quarry. The output runs eighty cars per month during the season, and blocks of 160 cubic feet have been shipped. The stone is of excellent cleavage and at one set of blasts perfect blocks as large as 46 feet long, 16 feet wide and 12 feet thick have been loosened. Before these could be even turned over or moved, let alone lifted by the thirty-ton derricks, they must be split in three or four pieces.

FARMING.

It is respecting culture of the soil that we find among the most erroneous impressions of Arizona and of Yavapai County. But we can and do raise here all cereals, vegetables and fruits of the temperate zone, and figs and almonds even ripen. In the Sierra regions the numerous water courses afford irrigation facilities in great measure, which can and will be greatly increased by the construction of reservoirs for storage. In some valleys, notably Williamson's, Lower Kirkland and Skull Valley, the underground flow dispenses with need for surplus water. In the plateau regions there are no streams for irrigation (excepting the meagre cultivated acreage of the Supais in Cataract Canon), and summer rains form the chief dependence of the soil tiller. Many plants of great value are found growing in native luxuriance upon the plateau regions. Potatoes, onions, tobacco and flax by their wild growth give ample proof that cultivation will not be fruitless. As to areas now under cultivation and which may be brought under cultivation, the table here shown is based upon careful estimates closely verified by much inquiry from reliable sources, the first column showing the acreage now under cultivation and the second the estimated cultivable area:

Flagstaff.....	2,500	10,000
Williams.....	1,200	5,000
Agua Fria.....	5,000	7,500
Prescott and vicinity to Little Chino.....	8,000	15,000
Upper Kirkland.....	1,000	5,000
Lower Kirkland.....	3,000	6,000
Thompson Valley.....	1,000	1,200
Skull Valley.....	2,500	8,000
Hassayampa.....	5,000	8,000
Peoples Valley.....	1,500	7,500
Upper Verde.....	570	2,000
Middle Verde.....	600	2,500
Lower Verde.....	1,500	4,500
Oak Creek.....	500	1,200
Beaver Creek.....	500	1,300
Williamson Valley.....	7,500	12,500
Turkey Creek.....	1,000	2,000
Chino Valley.....	2,000	75,000
Spring Valley.....	500	1,200
Mint Valley.....	300	600
Cataract Creek.....	1,200	2,000
The Mormon country.....	2,500	8,000
Outlying settlements.....	1,500	10,000
Total.....	50,870	196,000

It will be seen by this that the estimates heretofore made are decidedly low. Even with the acreage as given above there is just comfortably six acres of land cultivated for each inhabitant of the County.

There are raised in goodly quantity and of excellent quality, wheat, barley, oats, buckwheat, rye, corn, hops, potatoes, sweet potatoes, squashes, pumpkins, melons of all kinds, parsnips, carrots, turnips, radishes, onions, peas, beans, celery, cauliflower, cabbages, lettuce, peaches, apples, apricots, plums, prunes, some figs, almonds, gooseberries, currants, raspberries, strawberries, blackberries, besides many others. The plateau regions are somewhat high for fruit, though on the eastern slope of the San Francisco mountains raspberries, strawberries and wild grapes grow in abundance. In all the valleys of the Sierra regions fruits of all kinds and of most excellent flavor grow abundantly. The fruits brought in from Granite creek, the Agua Fria, the Verde, Lynx creek and other regions to the Prescott market sell more readily at the same prices than do the California fruits. They have a luscious, juicy taste, lacking that dryish, woody taste of fruits from other regions.

Alfalfa, or lucerne, cuts two crops a year in the Verde and other valleys, leaving an excellent pasturage after. In the plateau regions are raised the finest potatoes grown anywhere, producing immense crops of fine, large mealy potatoes, not watery or insipid articles full of great hollows. They there form a staple export and are a regular crop.

In all the parks and plains plump-grained, heavy wheat crops and other cereals can be raised. But without flouring mills the wheat can only be utilized for hay, only enough grain being allowed to ripen for seed. In the Verde Valley, especially now that the market for barley is much lessened, wheat to supply much of the County with flour can be raised. A limestone country, it is well adapted to wheat, which may be put in any time from November till March, raising a ton and a half to the acre. Flouring mills erected there and in other parts of the County would be excellent paying investments and could stop the outflow of over half a million dollars yearly for flour imported, resulting in immense good to the whole County. With the constant growth of the County and of the mining interests, the farmer finds more ready market for his produce, and wealth is his with care.

THE MINING INTERESTS.

Time in his passage adds strength to Humboldt's assertion that in this region we hold the mineral wealth of the world in greatest variety and value. To give even a synopsis of the gold and silver mines alone, entirely passing other metals, would consume volumes. In the plateau regions, the carboniferous rocks are found underlying the whole plateau, with the triassic, jurassic and cretaceous in order rising above them, the coal measures being found out of their usual place in the cretaceous beds. Blue Canon, coming out of the Moqui reservation, is so named from the color imparted to the lower rock walls by the dripping from the overlying coal beds, which reach as great a thickness as eleven feet at places. In the Grand Canon are beds of rock salt almost illimitable. As expressed by my informant, "it would take all the men of Arizona, working all their lives, to move a fraction of it." In Cataract Canon is a mining district of that name, of carbonate ores carrying 70 per cent. lead and forty ounces silver. It is a blanket ledge, running from two inches to three feet in thickness, and can be traced for seven miles, to the outlet in the Grand Canon. The great distance from railroads and the difficulty of raising the ores out of the canon has hindered development. In the northeastern part of the County is the Butte Valley copper district, but lately opened and not yet fairly developed. The body of ore runs entirely through two large mesas, and carries a high per cent. of copper. In the Grand Canon is a district of that name of silver sulphides but just opened and not yet much developed. But it is in the granitic and schistose rocks of the Archaean formation, in the Sierra region that we find the most profuse mineral wealth. Almost all known minerals and metals are found here. Gold and silver especially in all their varied ores and form, and everywhere, in close juxtaposition, are wood and water in abundance for the better working of the mines. Ore has been found that went as high as \$15,000 to the ton; not much of it, but some. From the placers of Lynx creek, Big Bug, Hassay-

ampa and others fully four million dollars in gold has been taken. Lack of transportation facilities has greatly hindered the development of Yavapai's mineral wealth, and it is only lately that ores of as low grade as \$30 per ton could be worked with any profit. The location at Prescott in 1887 of the sampling works, built by the Arizona Ore Company, has given a far-reaching impetus to mining which is making itself felt very sensibly. This company buys gold, silver, lead and copper ores, and makes its profit in handling ores by the carload, together with blending ores in such manner as to get higher results from each ore than if worked and sold separately, the miner losing nothing. There are over thirty mining districts in the County, with boundaries indistinctly defined, and to mention all these alone would consume our full space. Many mines once thought to be worked out are proving excellent producers under proper management. In some mines where mills were successfully run for years, until the ores at the greater depth run from free milling ores to sulphurets and concentrating ores, work was stopped with loss of profit by milling and no steps taken toward concentration. It is hardly any discredit that the major part of the ores are base—not easily reduced by available processes. It simply means that concentration will take the place of milling to a greater extent, and that more of the valuable metals will be saved in the end; for a great saving is usually effected by concentration, where by attempts at milling much gold and silver are lost. Not that we have no mines of free milling ores and no mills running at a profit. There are many. But as in the Congress, Ryland, Senator and others, concentrators are used as adjuncts to the mills, accomplishing the best attainable results with the ores handled. Some mines were virtually abandoned when the ore became baser with the greater depth reached. Most of those can be and many are now worked with profit by concentrating. Almost every mine has its pile of what is denominated "second class ore," which only awaits opportunity for concentration to become a source of profit to the owner. Though the present year has seen a greater ratio of development work to the amount of shipments than heretofore, and though the first half of the year has usually the lighter shipments, yet 1890 compares very favorably with 1889. The latest reports of the Director of the Mint credits Yavapai County with a production in 1889 of gold, \$461,705; of silver, \$162,759; total, \$624,464. Careful estimates (in many cases the actual figures were given, but in confidence) put the product for the first six months of this year at gold, \$260,200; silver, \$82,300; total, \$342,500.

During the year many mines have been opened, and some formerly abandoned workings have been reopened with profit: notably, the Senator, in the Hassayampa District, which has over 2000 feet of development work, carrying gold sulphurets, with some free gold, and where

has been put in a fine ten-stamp mill with a concentrating plant. The same company has been doing much work also on the Boggs & Hackberry copper property. The Silver Prince and Black Warrior, too, in the Bradshaw country, mines that were once heavy producers, but since abandoned, have been reopened. Forty men are constantly employed on these mines, furnishing much ore for the Tuscumbia ten-stamp mill, re-started on these ores. In the Bradshaw country, including the Peck, Tiger and Bradshaw Districts, there has been manifested great activity; paying, too. The Crowned King, Ryland, Rapid Transit and the Old Reliable group have been highly developed, the ore taken out paying all expenses of development, leaving large amounts of ores on the dumps. The Ryland has a twenty-stamp mill in active operation, with eight Triumph concentrators, the ore being free milling and concentrating gold ore. Forty men are employed, and the ore taken out in development has built roads and tramways and paid for the mill. The Rapid Transit is silver quartz, free milling, running to 350 ounces of silver to the ton, having 1000 feet of development work all paid for from the ore taken out. The whole mountain back of it, comprising about two miles of locations, can be best worked from and through it. The Hill-side properties, in the Eureka District, have not been heavy shippers this year, but much development work has been done. Altogether, there is over 7000 feet of development work, the ore taken out paying all expenses, including the building of roads, sawmills, etc., with still 1500 tons of good ore on the dump. At the Congress, in the Martinez District, work has progressed and ten stamps have been added to the former working capacity, consisting of a twenty-stamp mill, with a large concentrating plant. The development work runs well up into the thousands, the ore being principally gold sulphurets, with some free milling, the output running into the millions of dollars. In the Walker District, sometimes called the Lynx Creek District, which has averaged a yield of \$40,000 per year since its discovery, in placer mining alone, much work has been done in ledge mining also. The Amulet, Belle, Middleton, Favorite, Mark Twain, Happy Jack, Kitty, Oro Plata, Wadleigh, and many others have been worked to advantage, the better ores taken out in development paying all expenses, with thousands of tons of good concentrating ores on the dumps. In the Black Hills District the United Verde Copper Company has continued active work, recommenced in 1889, and their shipments of copper matte form much of the Prescott and Arizona Central Railway freight. Of other districts, the Groom Creek, Weaver, Turkey Creek, Tip Top, Big Bug, Agua Fria and Cherry Creek, especially have furnished much ores for shipping. In Cherry Creek a ten-stamp mill was completed in the fall of 1889 at the Mocking Bird mine, and has done much work. Another mill was put up in the Big Bug District during the first half of this year, and a five-stamp mill also, in Skull Valley, for the Weaver District,

Besides others, Phelps, Dodge & Company are now erecting mills on the Senator property. This year, too, witnessed the finding of one of the largest nuggets of gold ever found in the County, valued at over \$600, picked up in the Big Bug District. The Scotch Lassie mine, in the Turkey Creek District, has a ledge of silver-bearing ore 12 to 14 feet between the walls.

Twenty-eight miles south of Prescott, at Myers' Station, on the principal route of travel between Northern and Southern Arizona, is located one of the strangest geological freaks in the Nation, in the shape of a quarry of Mexican onyx of a couple of hundred acres in extent. The stone is what is scientifically known as travertine, and takes its name from its old Latin appellation of *lapis tibernius*, which it received from having been used by the Roman Emperor Tiberius, in the construction of the Collisium in the Eternal City. Where or how Tiberius obtained the stone of his day has always been an unsolved enigma to antiquarians and scientists, for the most persistent efforts have failed to disclose the old Roman quarries. Whether they were exhausted and then abandoned, or were neglected until forgotten, will probably never be known. To the modern world the existence of travertine was unknown outside of the four quarries in the State of Pueblo, Mexico, until the discovery of the Arizona onyx at Myers. The demand for the beautiful stone had nearly exhausted the Mexican quarries—which are of very small extent—when the announcement of the discovery of the Arizona quarry was made. Experts from all sections at once flocked into the new location, doubting the truth of the report, until they had personally seen the beauties of the discovery. The stone was universally pronounced as being far superior to that of Mexico, on account of being free from the flaws which characterize the latter, while the fact that it could be extracted in any size, shape and color desired made it doubly desirable, as the onyx of Mexico is only found in boulders of ordinary sizes, without any regularity of shape or color. The scientific explanation of the occurrence of the quarry is that the ground now covered by it was, at some remote time, the bed of an immense lake, created by a mineral spring or springs, the waters of which were strongly impregnated with lime, iron, manganese and other minerals. The first of these (lime) created the body of the onyx, while the last named gave it its colors. How very ancient the formation is, is shown by the volcanic dikes, which, in a few instances, have been thrown up through it, since the creation of the onyx.

To the layman the quarry presents as many interesting features as it does to the geologist and scientist. Its beautiful colors of black, white, red, emerald, pink, opaline, translucent old gold, russet, purple, with all their tints and shades, make up a combination never, perhaps, before seen in stone, while the vagaries that nature has played in combining

them has produced the most fascinating effects. The quarry is worked by its present owners, Messrs. O'Neill, Dougherty & McCann, and as the Mexican mines have heretofore been unable to supply the demand for onyx, at prices ranging from \$7.50 to \$20 per cubic foot, it promises to be, in the near future, a prominent factor in the industrial pursuits of Yavapai County.

Of other minerals within the county are asbestos, aluminum, bismuth, sulphur, zinc, mica, fire clay, kaolin, gypsum, soda, hematite iron, and others.

STOCK RAISING.

In no one thing does Yavapai County rank higher than in its stock interests and capabilities. While the plateau regions are pre-eminently the grazing regions of the County, nowhere are they altogether lacking. In the agricultural valleys of the Sierra regions, those lands not yet brought under cultivation are given over to stock raising. All the glades and slopes of our mineral-hiding hills and mountains are covered with nutritious grasses and forage plants. The climatic conditions are such that nowhere need stock be sheltered or winter fed. While the more valuable water rights are long since absorbed, every year some man of enterprise develops an ample supply of water for his stock and household use; or water is found by wells where it was thought none could be obtained. The most fruitful field is by water storage in reservoirs, by which means it is undoubted sufficient supply may be husbanded to accommodate ten times the present number of stock. Rock-walled canons and clay washes all over the County afford excellent sites for reservoirs, nor can there be any doubt that with the settlement of the country the rainfall becomes more abundant. All else being provided, we have only to see to the food supply. All grasses and forage plants cure standing, and they are constantly increasing in quantity, quality and variety. In the higher altitudes and furnishing abundance of food even as high as 9000 feet elevation, is the pine grass. While it may possibly be classed as a bunch grass, it grows thick and high, affording a most excellent summer range, of great fattening qualities. It is found all over the plateau regions, but especially in the mountainous timber country. What is now commonly called bunch grass thrives best at an altitude of from 5,000 to 7,000 feet, and is widely scattered all over the whole County. It grows green in winter, even under the snow, and is the main dependence in the winter season for green food. The bunch grass here is exactly like that of Montana and the North, the main dependence of the Northern stockmen for stock food winter and summer. While a hardy grass, it may be killed out by too severe pasturing, and then renewal is difficult. Of the *giata* or *gayette* and Sacaton grasses very little grow in this country, both being more adapted to the lower desert countries, and not quite so good as our own grasses. But we have

in abundance the far superior grasses, the white and black gramma. Of these two the white is the hardier and makes a dense sod. The black usually has one large tap root to a bunch, and grows on a somewhat lower plane, giving the name to "Black Mesa," by reason of its abundance there. Both grasses are very nutritious, and afford superior nourishment for all kinds of stock. The white gramma especially is used for hay making. Besides these "stand-bys" of the Arizona writer are many other excellent forage plants. The white sage, the Nevada stockman's chief dependence, is widely scattered over the plains of the plateau region, where it is the main winter food for all kinds of stock. It forms a large part of all ranges in those regions and is the best winter food in the County. It grows in abundance, and in many places excels the far-famed Nevada ranges. Another variety, called the mountain sage, or "Mormon Tea," is a good food plant, and having superior medicinal qualities. The green sage, another variety, usually grows near the white sage, but being much lower, and forming a sort of turf, it is left for the sheep. Then for winter browsing in valley and foothill are several useful plants. The manzanita is much fed on by sheep, while a small bush, with a leaf like a rabbit ear, commonly called the *chincapin*, ranks with white sage as a winter browse. For a fresh feed during the first three months of the year in the Verde Valley, the elm weed is recommended. It is fairly a desert grass, has a taste something like slippery elm bark, whence its name, and sheep reveling in it fairly roll in fat. First in the spring comes the "six weeks'" grass, which matures from the seed in six weeks, after rains fall. With it, or following, comes the California importation, *alfileria*, brought in with the first sheep from California, and rapidly spreading all over the country. It is a boon to the stockman, furnishing the main spring stock diet until the summer rains bear fruitage. It is a vine-like plant, averaging six to eight inches high as it stands, but the stalks grow sometimes to seven feet while standing probably only fifteen inches high. Another excellent forage plant, as yet unmentioned by any writer, is the wild pea vine, growing in the mountain region in patches of half an acre to an acre, sometimes where other plants will not grow. It does not form a sod, but is hardy and very nutritious. It goes to some higher altitudes than bunch grass. The pea, itself, is as nutritious as corn, and after the frost kills the vines, horses and sheep will run away to reach the pea fields. The "blue stem" is more cosmopolitan, growing all over the Southwest, forming the heavy hay exports of Kansas and of Las Vegas, New Mexico, whence it has been shipped here. It is the most nutritious hay known, and scorns the tender care required by other plants, finding foothold for rank growth in lava-covered hills, where rocks lie thick, excluding other plants. Where formerly there was little of it, it now covers millions of acres, and even at two years old makes a good hay and food. It is the hardest of all grasses, stands

the heaviest drouths, and grows the rankest of all with rains. Apparently *the* native grass, it is becoming staple for wild hay and pasturage, and still "comes up smiling" after close feeding fatal to other plants. Under favorable conditions there is no plant that will produce so much forage to the acre as the famed lucerne, or alfalfa. In the lower valleys of the Sierra regions it is cut two to four times a year, giving as high as a ton and a half an acre to the crop, and after all leaving excellent pasturage. That it will thrive in the mountain regions without irrigation may surprise some. But on what was once a hard-packed rocky yard in Flagstaff, where lay the *debris* from the building of a brick residence, the writer has seen it enjoying good growth, reproducing from the seed and growing three feet high; that, too, on the north side of the house, where snow lays long in the spring. But a greater surprise yet was to find growing in the same yard, the world-famed, hardy and most excellent German forage plant, the *sainfoin*, or *esparcet*. All domestic animals fairly love it, fowls even thriving upon it. It has strong, tough roots, spreads much, and well introduced here will double the productiveness of our stock regions. One clump, that had been protected from the chickens only, growing in that hard soil without attention or water, had a rank growth to fully four feet. An enterprising rancher near Williams has introduced the oat grass, or evergreen grass, getting its first name from its oat-like, nutritious seeds, and the second by reason of being green the year round under frost and snow. Another name is tall meadow grass, and it is indeed tall, growing to shoulder height. At an elevation of fully 7000 feet without any irrigation, in the second season after planting, it cuts two crops a year of two tons to the acre each crop, after that furnishing excellent pasturage, the aftermath being of thick growth. It has long roots, stands heavy drouth and frosts, remaining a deep green color at all times, does not winter kill, and comes out early in the spring. It is quick to "catch," hardy from the first growth, and besides reproducing from seed, "stools" out, forming a dense sod. Its fattening and strengthening qualities are most excellent and stock are most fond of it. Clover and timothy, too, grow rank on plateaus as well as in valleys and make good food. Fortunes after fortunes have been lost in California because their grasses do not sod, but must come up from the seed. But with the grasses and forage plants we have now and can have, drouth does not hurt us, except in the way of scarcity of water as a drink. The next year our food is still on hand, and we have no death-dealing dearth of food following the drouth for years.

One other question: Are stock diseased or healthy? We answer separately with each kind of stock.

Of the various stock industries cattle rank first. They are found all over our County on almost every square mile. Our dry, pure, oxy-

genated atmosphere is conducive to the good health, not alone of man, but also of animal. And there is here an utter and absolute lack of splenic fevers, pleuro-pneumonia, big-jaw, black-tongue, hoof-ail, black-leg, murrain, Texas fever or like diseases. In fact, there are no cattle diseases known here, and the stockman has only accidents to contend with. With any care or attention at all losses seldom go beyond 2 per cent, and very rarely reach 5 per cent. Careful estimates give the average increase at $33\frac{1}{3}$ per cent on the whole number of cattle, and no stockman who used care ever failed in the business. Truthful figures put the number of beef cattle shipped and driven out of this County alone for the first half of this year at not less than 18,000 head, purchased on the range at \$15 to \$17 per head, and bringing into the coffers of the stockman fully a third of a million dollars this year. And yet, hundreds of cattlemen have not sold any beef cattle, holding for better prices. Fully 10,000 head more could go out yet this year without exhausting the ranges, and still leave next year to furnish as much as has been shipped. Yavapai cattlemen thoroughly believe and practice the County's motto, "Excelsior." We have here no bred-up Mexican stock, as in other counties, but started with good American cattle from the first. The famed dairy districts of Utah and California yielded us tribute of their best blood to commence the industry. And even in their darkest days the cattlemen kept breeding up by importing thoroughbred stock. More blooded bulls have been bought for its ranges than in any other County, and everywhere the passer-by sees blooded Galloway, Aberdeen Angus, Polled Angus, Durham, Hereford and Jersey bulls flourishing and improving the coming cattle to a great degree. In fact, the only importations for some years have been blooded stock for breeding. With all the shipments made, the Assessor found 12,854 more cattle this year than last.

Horses rank next in value, as assessed, and are as widely distributed as cattle. From Date creek, in Kirkland Valley, in the southwest, and the Verde in the east, to the San Francisco mountains, Demotte Park in the northeast and extreme north, are found growing herds of horses. Many ranches are distinctively horse ranches, and the owners are carefully breeding up with good blood on the hardy, earlier stock, producing an animal of great strength and endurance, and which is in demand by the United States Government for its needs in the Southwestern country. What has been said as to our healthful climate for cattle applies equally to the horse. Horses reach a high state of development here, and the best breeds flourish. Norman, Clydesdales and Percherons of straight pedigree have been brought in, and their progeny from the native stock bring \$200 to \$300 per head and weigh 1400 to 1500 pounds. And it can only be added that the horseman's prosperity measures with all others, and there is still abundance of room for more, with a steady and sure market for their increase.

But for a steady money-producer commend us to sheep. When the "Little Corporal" turned his attention from east of France to Spain, in crossing the boundary Pyrenees, he found on either side the French and Spanish Merino sheep, developed to the highest type then known to the world. Careful herding from mountain to valley in winter and back to the rich mountain ranges for summer made these animals world-beaters. But in the plateau regions of old Yavapai we find better conditions even than the Pyrenees present, and taking their best blood, we have improved upon it, producing right here the finest all-around wool and mutton animal known to the world distinctively as the American Merino. Australia, which improved upon the French and Spanish Merinos, no longer goes to France and Spain for blooded breeding rams, but comes to America. Arizona wools, scoured, sell advantageously side by side with the best Ohio XXX wools, and the best Australian wools. Our wools have finer, stronger fibre and greater length of staple than any other known wools. One wool house has for nine years regularly purchased two clips from Yavapai County as being the best wools they could obtain, even exceeding the Ohio and Australian wools. In Asia Minor, in the days of the old Chaldeans, sheep first reached a high state of perfection; to have the honor of the highest known standard, constantly improved upon, go thence first to Spain, to Australia and now here. There are sheep in Yavapai County whose pedigree traces back through Spain to the importations thence of the best Asiatic blood. With better climatic and food conditions, our sheep men have improved upon the methods of the old Chaldean astronomers, and have taught their sheep to rest by night and feed only by day. Ours are not mere graded Mexican sheep, but straight out American Merinos. In the beginning of the industry, from California were imported sheep that there competed on equal footing with Ohio and Australia. Here the same sheep have improved in every way. Arizona stands highest in amount of wool clipped per head, even as against the world. And as Yavapai County has half the sheep of the Territory, and the best sheep in the Territory, we have reason for pride. England's boasted open-wooled Cotswolds and Downs are excellent mutton sheep, but in their marshy climate, adapted to those breeds, our Merinos could not flourish. The Merinos thrive best in dry, mountainous countries. Our Arizona sheep are freer from disease than anywhere else in the world, even though managed in a primitive way, with no sheltering or winter feeding. Our dry alkali, salty, sandy and limestone soils are the sovereign remedy for foot-rot, a fatally destructive disease in many regions, and most legislated against. It is an infectious disease elsewhere, but sheep brought here affected with it not only recover without treatment, but do not infect other sheep. While scab elsewhere destroys the wool and kills the sheep, it is never fatal here,

and only destroys the wool where no cure is given. It is the only ailment known here and yields readily to treatment. The loss of wool by scab is minimized to less than 1 per cent by the simple plan of "dipping" the flocks once a year. Fluke, or liver rot, being a damp-country disease, is utterly unknown here. Nor is the foot and mouth disease, which kills its millions elsewhere. With decent care 80 per cent on the ewe flocks is a low estimate of increase. A comparison of the assessment roll of 1890 with that of 1889 shows an increase of 50 per cent. That, too, with no importations, but a heavy outflow. From Yavapai County alone fully 25,000 sheep have gone this year in droves and shipments at prices ranging from \$2.40 to \$3 per head, prices elsewhere ranging from \$1.75 to \$2.25 per head. There are fully 275,000 sheep in the county, and the undeveloped regions north of the Atlantic & Pacific alone are capable of sustaining half a million to a million sheep. This year's shipments of wool from the Territory have been 3,000,000 pounds of American wool and 600,000 pounds of Navajo. Of this amount Yavapai has furnished the larger and better part, with 1,800,000 pounds of American wool and 250,000 pounds of Navajo. At an average of 15 cents per pound our yearly wool income is over a quarter of a million dollars.

Near Prescott, and in Charmingdale, small herds of Angora goats have been run with profit, their wool commanding 30 to 60 cents per pound. They are hardy, healthy, easily cared for, and their raising is a profitable business.

The loss of the dams erected in the Hassayampa by the Walnut Grove Water Storage Company, in February last, was a public calamity not only in the lives lost and property destroyed, but in the lost opportunity to test the storage principle in cost and utility. The main dam was 100 feet long and 135 feet thick, at the bottom, 125 feet high, and at the top 410 feet long and 12 feet thick, forming a reservoir of 4,500,000,000 gallons capacity; a lake, in fact, a half-mile wide and nearly three times as long. Another service dam had been constructed farther down to raise the water for the flume, which, as constructed for four and a half miles, carried 1200 miners' inches to the placer grounds and agricultural regions below. It is to be hoped the company can carry out their present intention of rebuilding. On Lynx creek an English company has constructed an immense dam, forming a reservoir over a mile long, whence they will draw water for irrigating the 6400 acres they have bought, for hydraulic placer mining and for grazing purposes. The lake will be stocked with fish, adding to our food staples, and, situated in a pine-bordered valley, will make a fine summer resort. In the plateau region over twenty reservoirs have been constructed by stockmen at different points, adding very

much to the resources. One set of reservoirs at Volunteer Springs, near Bellemont, has supplied over 2500 tons of ice for the present season. About a thousand each of carp, perch and trout have been given homes there and are multiplying rapidly.

An omitted, because overlooked industry, is bee-keeping, profitably followed in the Agua Fria, Verde and other valleys; some bee-men having a product of two to five tons of honey each for the present season.

EDUCATIONAL.

In education Yavapai County is still wide-awake. Out of a school census of 1316, there were enrolled as attending school during the year ending June 30, 1890, 1036 pupils, of which 535 were boys and 501 girls. The percentage of enrollment compares favorably with the compacter Eastern States, especially when many pupils have from one to three or more miles to attend school. In one district alone a large number live more than 10 miles from the school house of the district. The average number of pupils belonging was 730.6, and the average daily attendance of 652 gives an excellent attendance percentage of 89.3 per cent. That of a total enrollment of 1036, the average number belonging is cut down to 730.6, is not in the least discreditable, remembering that many pupils can attend only when their families move in from the ranches to the schools. In only two districts are there more than one school, Prescott having employed five teachers and Flagstaff three, making a total of forty-four schools in thirty-eight districts. Only four districts are without school houses, and they are the four districts organized during the year. Only one district reports insufficient school grounds. All school houses are well ventilated, so the reports go; all use the authorized series of text books, and none found it necessary to vote any special taxes during the year. Only one district reports no furniture or apparatus, while the great majority are favorably supplied, especially in furniture. In the libraries of the six districts reporting libraries are 249 volumes—a good average to the district. Of the 48 teachers employed during the year, there were 20 male teachers and 28 female. Of these, 6 are graduates of normal schools, 2 hold life diplomas, 2 educational diplomas, and there are nineteen of each class holding first and second grade county certificates. The monthly pay runs from \$65 to \$125 per month, the male teachers averaging \$80 and the female teachers a close second at \$75 per month. The total number of visits by trustees during the year was below the legal requirement, being only 83. The total number of months taught was 286.5, being an average of 6.5 monthly per school. Fifteen schools reported more than eight months' school each. That our districts

believe in keeping good teachers when they have them, and at good wages, is evidenced by the high average pay and by the fact that there were only ten applicants for certificates during the year; and that of these, four were rejected, evidences the high standard required. Three of each sex received certificates. The financial portion of the report speaks well. At the beginning of the year the cash on hand was \$5056.48, the receipts from the Territory were \$500, and the County levy of 50 cents on the \$100 realized \$32,909.78, making a total of \$38,466.26. Of this, teachers' salaries consumed \$23,265.41; \$1852.86 went to payment for "rent, repairs, fuel and contingent expenses"—school libraries were slow investment at \$7, while school apparatus took a boom to the amount of \$1705, an average of \$45 for the district. Then for "sites, buildings and furniture" was expended \$532.50, leaving the sum of \$8874.85, a most excellent "nest egg" for the coming year. In the six apportionments during the year \$33,409.78 was parcelled out. The value of school lots, houses and furniture existing is put at \$40,137, of libraries, at \$668, and of apparatus, \$2281, totaling \$43,086, or nearly \$1200 to the district.

POINTS OF INTEREST.

Space cannot be taken to describe all the inducements to the tourist and antiquarian. Crossing the northern part of the county is found the grandest part of Nature's greatest marvel, the Grand Canon of the Colorado, besides which all other natural wonders pale into insignificance. From Flagstaff and from Williams are excellent roads, affording a very pleasant journey. Near Flagstaff are the Cliff Dwellings, the Cave Dwellings, (unique as being the only ones of their kind within the United States), and Oak Creek Canon, famed for its scenery and trout fishing. From Williams and Prescott Junction can be reached Cataract Canon, with its towering, vertical walls, its resplendent water falls and limestone stalactite deposits about and around plants and other objects. All kinds of game abound in the mountains of the plateau regions, and scattered all over this region and through the Verde Valley are the ruins of the dwellings of prehistoric races showing no mean skill. In the Tonto Basin is the Natural Bridge, far exceeding Virginia's wonder. In the Verde Valley, too, are the Aztec Mounds and the Montezuma Well, with a warm soda spring of excellent medicinal qualities near by. The Castle Creek Hot Springs in the southern part of the county are much visited by tourists and invalids, and wonderful cures have been effected.

Capital will find opportunities in constructing reservoirs for irrigation, mining and grazing purposes; in developing the mines; in stocking ranges where water may be developed; in erecting concentrators and mills for mines, and especially in building flour mills. The labor

of good, steady, sober, honest and industrious men is always in demand at excellent wages. The average wages paid on the farms, cattle ranges, sheep ranges and in the lumbering districts are \$35.00 to \$40.00 per month and all expenses. Miners get from \$2.00 to \$3.00 per day, while skilled labor is always in demand at higher rates.

MOHAVE COUNTY.

MOHAVE COUNTY is situated in the northwestern part of Arizona, has an area of 12,000 square miles and population about 1500. Principal industries are mining and stock raising. Mines have been worked in this county for the past twenty-four years, and when first discovered the ores were shipped to England by the way of the Gulf of California for reduction. Then upon the advent of the Southern Pacific Railroad into the Territory, they were sent via the Colorado River to Yuma, thence by rail to San Francisco, Cal. From this it can be readily understood that only mines with exceedingly rich ores, could be worked profitably on account of the enormous cost of transportation. Of late years, however, considerable attention has been attracted to the mineral resources of Mohave County. Capital is finding profitable investment in the mines. Properties are being opened up. New discoveries are being made. The prospector is enabled to realize on his ores as soon as they are brought to the sampling works, which are located at Kingman, and a new era of prosperity has evidently dawned on this comparatively unknown section of Arizona.

A conservative estimate of the ore produced from July, 1889, to July, 1890, is placed at 5000 tons, returning to the owners from \$750,000 to \$1,000,000.

The general formation of the country is granite and porphyry with lime. The mines are easily worked and very little timbering is necessary. The mountains are of a comparatively easy grade and roads to the mines are made with little difficulty. The principal mining districts are Mineral Park, Chloride, Stockton Hill, Todd Basin, Cerbat, Weaver, Hualapai, Layne Springs, Lost Basin, Signal, Hackberry and Music mountains, and from a great many of the mines which are now shipping ore the grade will average from \$200 to \$500 per ton.

About twelve miles southeast of Yucca, on the Atlantic and Pacific Railroad, is located the Antler mine, recently purchased, along with

others, by the well known mining firm of Phelps, Dodge & Co. The product is copper and silver. Development work is now being pushed on this property, and a large body of ore of excellent grade has already been uncovered. A branch railroad from Yucca Station to the mines is in contemplation, and reduction works will undoubtedly be built at the mine in the near future. This district promises to be one of the most prosperous in Mohave County. At Signal, sixty-five miles southeast of Kingman, is located the famous McCrackin mine. This is one of the largest in Arizona, having a vein that will average 35 feet wide, and frequently ore bodies are found that run 60 to 100 feet wide. The ore is free milling, silver, but of a low grade. On the same ledge is located the Signal mine. On the McCrackin mine there is a twenty-stamp mill, and on the Signal mine a ten-stamp mill. Quite a large amount of development work is being done in this section, and it is confidently expected that, with an advance in the price of silver, active operations will be resumed on these large properties.

An excellent opportunity is presented in this neighborhood for capitalists to secure valuable properties at much less than their actual value, on account of the fact that water is encountered at a depth about 100 feet, and to furnish proper pumping machinery entails an expense which few of the prospectors are able to pay. The Arizona Sampling Works, established since 1883, at Kingman, have a capacity of 30 tons per day and employ eight men in the works, steam rock crushers, breakers, rollers and jaws, run by a 35-horse power engine. The sampler has been a boon to the miners in Mohave County, and has been the means of stimulating the mining industry in this section. The product of the sampling works in 1889 was \$500,000. This amount distributed among the miners of Mohave has been the incentive to the large amount of development work which has been done. At Cerbat there is a five-stamp gold mill erected, and a five-stamp silver mill, with roaster, pans, settler and concentrator; also the Flores mill, with ten stamps. At Mineral Park is a five-stamp mill, on the Sunlight mine, a dry crusher and concentrator. At Gold Basin, a ten-stamp combination gold mill, complete. At Cedar, one five-stamp mill. At Signal, one ten-stamp mill and one twenty-stamp mill. A four-foot Huntington mill is built on the Moss gold mine on the Colorado river.

On a great many of the mines now being worked, the owners are erecting hoisting machinery and reduction works of various kinds, and the mining industry in Mohave County is in a prosperous condition.

The cattle industry in Mohave County is in a very satisfactory condition; the range throughout the county is excellent. Cattle are of a fair grade, which is yearly being improved, and those engaged in this business have, during the past year, had a profitable market for the beef

which was ready to be sold from the ranges. About 60,000 head of cattle and about 5000 goats range in the mountains and on the mesas in this county.

The only agricultural land at present in Mohave County is in the valley of the Big Sandy, about forty miles south from Kingman, and extends along the Big Sandy to the Santa Maria creek and Williams Fork, in the southern end of the county. This district embraces about 75,000 acres, of which about 2000 acres are under cultivation. Water can readily be had for irrigation, and, as the population increases, the amount of land under cultivation will be largely increased. The principal products are alfalfa, barley and vegetables. The average altitude of the Big Sandy Valley is about 2200 feet.

Hualapai Valley, about seventy miles long and twenty miles wide, is one of the richest in the West. Wells sunk to a depth of more than 100 feet show the soil to be a sandy loam, and to be equally as rich at the bottom as at the top of the well. Persistent efforts have not been made to find water in this valley, as the needs of this section have not demanded a large increase of agricultural products.

Sacramento Valley, about eighty miles long and twenty miles wide, is also an excellent body of agricultural land, covered with natural grasses, galleta and black and white gramma, but like Hualapai Valley, water has not yet been prospected for to any great extent, and very little of this land is cultivated.

North of the Colorado river, bordering on Utah, but still in Mohave County, there is a tract of agricultural land, in extent about sixty miles long by forty miles wide, on which are a number of large springs of pure water, sufficient to irrigate a large quantity of this land. At present it is settled by a Mormon population, whose chief occupation is cattle-raising, and who do not cultivate more of the land than sufficient to raise a crop for their own consumption. Mount Trumbull, also on the north side of the Colorado river, is covered with a heavy growth of white and yellow pine, and the Mormons have a sawmill erected from which they produce lumber for their own use only.

The timber belt, in which Mount Trumbull is located, is the best in this section of Arizona, and is capable of producing a large quantity of lumber and of an excellent quality.

At the residence of Judge J. M. Murphy, at Kingman, can be seen what the soil will produce, with irrigation. Grapevines two years old have a profusion of grapes, the vines being loaded down with fruit. Peach, cherry, plum and fig trees, with an abundance of fruit, are convincing arguments that this section of Arizona is one of the best for fruit raising. In the gardens are rose trees, oleanders, morning glories,

and all the flowers that can be seen in a tropical garden. To visit this residence and grounds is truly a revelation to anyone unacquainted with the country, and is an evidence of what the soil will produce, with a little water and some attention. Locust trees, three years old, have attained a height of twenty-five feet.

Kingman, the county seat of Mohave County, on the Atlantic and Pacific Railroad, 561 miles from Albuquerque, 681 from San Francisco. Population, 300. Altitude, 3600 feet. Chief industry, mining and stock raising. It has two general merchandise stores, drug stores, hotel, three restaurants and several lodging and boarding houses, three saloons, lumber yard, Methodist Episcopal Church, good public school, one newspaper, the Mohave County *Miner*, court house and jail, two sampling works, blacksmith and wagon shop.

A new two-story court house is now in course of erection. The town is supplied with water from springs and wells at Oak creek and piped to Kingman, where it is distributed throughout the houses. An abundance of water is also found in wells at a depth of about 100 feet. Kingman is the leading town in the County, and is the base of supplies for all the mining camps and the stock industry in Mohave County.

YUMA COUNTY.

THIS, the southwestern division of the Territory, is one of the four original Counties established at the institution of a Territorial government, and in date of settlement ranks second.

Yuma County was first inhabited by whites in 1771, when a detachment of Franciscan friars established a mission upon the Colorado River opposite the site of the present town of Yuma, and sought to bring the light of Christianity to the then savage tribes of the Colorado River. This pious enterprise had but a short existence, however, and the County was surrendered to the sway of the Yumas until the tide of immigration to the newly-discovered California gold fields rendered the establishment of a ferry at this point necessary. The small settlement existed under many vicissitudes until it was assured of protection and permanence by the establishment of Fort Yuma in California, just across the river, in 1852. In 1878, the passing of the Southern Pacific Railroad destroyed the lucrative business of the town as the forwarding point for the whole of Southern and Central Arizona, and, all necessity

for a garrison having vanished, Fort Yuma was abandoned. Since that time the County has been dependent solely upon its own resources and the efforts of its citizens for its prosperity and progress, and its advancement is gaining added headway as the years roll on.

It has a population of approximately 2500, collected principally in the southwestern part, and scattered along the Gila upon the newly-located lands to be irrigated from the waters of that stream. The taxable property listed consists of 103,010 acres of land, valued at \$141,090, and personal property and improvements sufficient to bring the total county wealth, according to the very low estimate of the assessor, to \$851,338.50. This is the lowest valuation of property in any of Arizona's Counties, but, considering the sparse population, is not a bad showing. The County indebtedness is: Floating debt, \$49,595.07; bonded debt, \$117,700, making a total of \$167,295.07.

It has an area of 10,138 square miles, but a small portion of which vast expanse has as yet been made useful to man, though for the most part not through any lack of natural capabilities. It is claimed by trustworthy authorities that there are, within the County, fully 1,000,000 acres of land available for settlement and reclamation. Of this, about 115,000 acres are now capable of irrigation by the various canals in operation or under construction, though only about 18,000 acres are now cultivated. It will, by these figures, be seen that of agricultural land there is more than an abundance. But, the rainfall being very light (about 2.7 inches annually) and the air almost destitute of moisture, an inquiry into the water supply is important in the extreme, for by irrigation alone can the fertility of the soil be brought to its full measure of fruitfulness.

At the western boundary of the County, separating it from the State of California, flows the Colorado River, a stream the headwaters of which are among the snows of the Rocky Mountains, its course extending from Wyoming to below the Mexican line. This river, justly considered among the most important in the United States, carries a volume of water without limit as far as affected by any demands ever to be made upon it for irrigation purposes. Indeed, the immensity of its volume has caused no less an authority than John C. Fremont to seriously consider and actively advocate the diversion of a portion of its stream into the great basin of the Colorado desert in California, to the reclamation of that vast expanse of parched yet fertile land. Another scheme was, by its waters, to make an inland sea of the Indio Basin of the Colorado Desert, which is wholly below the level of the sea, having a maximum depression of about 160 feet. Such a lake would materially change the climate of the neighboring sections in making rain much more abundant. One of these grand projects will yet come to pass,

and either would be beneficial in the highest degree to Yuma County. Upon the Arizona side there is a project, which surveys by an engineer of ability have demonstrated practicable, to cut a canal from the Colorado about twenty-eight miles above the town of Yuma, at a point where the rocky formation of the banks and the narrowness of the channel, furnish important advantages for the construction of a dam. The plans for the dam embrace details of an effective lock, in order that the navigation of the river be not obstructed. In addition to irrigating the lands north of the Gila River, it is designed to construct an aqueduct across the latter stream, and to furnish water for irrigating the mesa lands lying to the south of Yuma. As far as the Mexican line the canal would be the means of irrigating 170,000 acres of unsurpassed fruit land. In addition, should concessions be obtained from the Mexican Government, there are in Sonora, available under an extension of the canal, about half a million acres more. Upon these Mexican lands is already established what is known as the Lerdo Colony, upon a large tract granted to General G. Andrade and others. The owners have been engaged for some time in the development of the property, inducing immigration and settling families on the land. About \$300,000 has been expended so far. This colony is dependent upon Yuma as its supply point, the distance being only about twenty-five miles. Wild hemp grows in profusion on the lands. The soil is of such a character that it will raise all the cereals, vegetables, tobacco, cotton, etc., and very liberal terms are being given to the actual settler.

The Yuma Pumping & Irrigation Company, a new enterprise, is now engaged in placing centrifugal pumps of large capacity upon the high banks of the Colorado, at the edge of the town of Yuma, and will soon be supplying several thousand miners' inches of water to the lands of the vicinity. This plan of lifting the water is not expensive, and is preferable in this case, with a small flow, to expending the large amount of money that would be necessary to construct a gravity canal, crossing the Gila with a flume.

AGRICULTURE.

The agricultural lands of Yuma County, to which the most attention is being paid at this time, are those along the Gila River. This stream, rising in the hills of New Mexico, and joined by many confluent in its course, flows from east to west across Yuma County, mingling its waters with those of the mighty Colorado immediately north of the town of Yuma. Its length within the County is, approximately, one hundred miles. Its valley is from two to ten miles wide, retreating usually in a terrace-like system of broad table lands or mesas.

The Gila, although receiving the not inconsiderable volumes of the Salt and San Pedro rivers, has an erratic manner in summer of occas-

ionally sinking into its own gravelly bed for occasional stretches of several miles, only to reappear undiminished when the stream is narrowed by rocky formations. Only at such points, therefore, is it advisable to choose dam sites. The following is a condensed statement of the irrigation enterprises that are now within the County or in process of construction, embracing the major portion of the available land of the Gila Valley :

NAME OF CANAL.	Length in Miles.	Capacity in Inches.	Estimated Cost.	No. of Acres Reclaimable
Mohawk	35	11,000	\$ 150,000	40,000
Redondo	5	600	8,000	1,500
Farmer's	13	5,000	15,000	10,000
South Gila	22	8,000	45,000	12,000
Purdy	10	9,000	25,000	7,000
Contreras	7	3,000	9,000	2,000
Saunders	10	5,000	25,000	4,000
Araby	8½	3,500	35,000	2,000
Antelope	7	2,000	10,000	2,500
Toltec	3	30,000	15,000	.....
Total	120½	77,100	\$ 337,000	81,000

In the event of the completion of the above-described works, in accordance with the original plans of the projectors, the total length would reach 241 miles, reclaiming 267,000 acres of bottom, valley and mesa land, at an estimated cost of \$1,318,000.

In order that a more constant flow be secured, to the end that there need never be a scarcity in the Gila during the summer season, and that the life-giving fluid may be spread far out upon the "mesas" and plains, through able management surveys were undertaken upon the Gila, with the view of locating feasible sites for storage dams. Such a site was found, lying within Maricopa County, a short distance from the division line. Here a dam 100 feet high, 1575 feet in length upon the top, would serve to impound 47,226,009,600 cubic feet of water, or sufficient for the irrigation of 600,000 acres of land during six months of the year. Vast as this amount of water is it would take but a few days of such floods as the Gila is annually subject to, to fill it to its utmost capacity. That such a reservoir will be provided there can be no doubt, for the lands immediately bordering upon the river will be occupied in their entirety before many years by thrifty farmers, and the orchardist will look with longing eye upon the mesas so eminently suitable for the growing of citrus fruit. Organized effort will then bring into existence this logical and effective method of increasing and

equalizing the annual available supply of water for irrigation. As it is, there is ample water for the lands now covered by canals, but with the aid of the reservoir's supply, the acreage could be doubled and a great body of land, unexcelled for the growing of citrus fruits, brought into usefulness.

Relative to the character of the lands to be irrigated in the valleys of Yuma County, nothing better could be presented than the following excerpts from a work prepared by Messrs. Trippel, Hicks and Steiger as a report to the Senate Irrigation Committee. The statements made may be glowing, but are truthful and prompted solely by an enthusiastic faith in a land that needs only energy and the aid of capital to become a garden, such as was Eden in its fullness:

"Fruit culture has so far been prosecuted upon a limited scale, but enough has been learned from experimental tests to demonstrate the positive feasibility of not only producing an excellent quality of the most profitable fruit, but also the ability to raise them for market from three to six weeks earlier than any section of California.

"The orange, lemon and lime, finding soils and climate congenial, yield in abundance large, clean-skinned and exceeding luscious fruit. They color handsomely, contain the requisite acidity and sweetness, and are very juicy.

"The fig and pomegranate offer a character of fruit that almost stamp them as indigenous. The latter is not yet recognized to any great extent, but it will certainly become an important factor in arboriculture when its economic qualities are better known. As to the fig, the most desirable variety has yet to be determined. The true White Smyrna would probably prove the best, and that its yield would be prodigious goes without saying, for the tree will bear three crops annually. This assertion is based upon actual productive results of the Mediterranean White fig, that is known *not* to be the *true* Smyrna.

"The grape seizes upon what is proffered to it, and becomes hardy, thrifty and adaptable. The choice naturally inclines to the earliest for table purposes. What those varieties should be is in process of experiment upon a scale that will soon solve the question; but it may be said that all kinds mature from three to four weeks before they do in California. They attain great size, cluster tightly on the bunches, are firm and highly colored, and possess exquisite flavor. Heavy wines and brandies of a superexcellent character can be made; but with light wines the reverse is true, for everything apparently goes to saccharine. For ripening wines the climatic conditions are admirable.

"The olive grows luxuriantly, and will in the near future become a most profitable investment. Whatever its characteristics elsewhere, here it requires water and cultivation—the more water the better.

"The mulberry matures rapidly, and when firmly rooted, vigorously withstands great heat and lack of water. It produces an early, large and sweet fruit, and is a highly desirable tree to plant along the canals for its grateful shade.

"The plum can easily be raised from the seed. It fruits early, though so far the product does not commend itself particularly for table use; but, as a stock upon which to engraft prunes, or even superior varieties of plums, it is everything to be desired. An experiment in this line with the best prune known in California showed a growth of twenty-three inches in forty days from the insertion of the graft.

"The date has passed beyond conjecture. The plant produces magnificently; and its cultivation will be prosecuted more extensively this winter than ever before. The soil is in every way suitable, and with occasional cultivation and intelligent irrigation a quick and early growth is assured.

"Apricots and peaches have been tested. They mature rapidly, bear choice fruit, and are always healthy, giving flattering indications of future success.

"As facilities increase, other fruit trees will be introduced, and with the same care that is bestowed upon them elsewhere will, so soon as they become acclimated, come to a yield materially in advance of the place from whence they came. The field is too large to admit of extended comment at this time, but it may suffice to refer briefly to certain other products which may, in time, equal, if not surpass fruit-growing as a commercial proposition, as, for example, wild hemp, cotton, ramie, sugar-cane, sugar-beets, etc.

"Cotton has been tried from time to time for years, with varying, but always satisfactory results, and even then without care. If watered regularly, it becomes a large bush, and if properly pruned, a tree, being in flower, ball and cotton the year round. These bushes and trees have, in instances, borne steadily for fourteen years. The staple, of course, diminishes in course of time, but at ten years it is not inferior to the average staple of Western India.

"Wild hemp is a textile plant indigenous to the country. It grows freely and luxuriantly to a great height, often averaging from fifteen to seventeen feet. It has a long, strong fibre, and is frequently worked into nets and fishing lines by the Yuma Indians. Convulsive attempts have been made to utilize this plant, with the practical result of fixing its value among the fibres used in the manufacture of cordage, at about \$160 per ton of 2000 pounds. After proper bleaching and manipulation, a beautiful fibre has been produced and manufactured into colored fabrics, taking the dye and retaining the elasticity and lustre exactly as

well as the fabrics of true flax and ramie. It seeds itself annually, and, immediately following the overflows of the Colorado River, takes possession of every nook, corner and open area, to the exclusion of everything else. It covers not less than one hundred square miles in an unbroken stretch, commencing near the boundary line of the Gadsden Purchase and extending southward along the river to Hardy's Colorado, below the point where the rising tides of the Gulf of California force back the flow of the Colorado River proper.

"The fibrous plant, ramie, has been given a partial trial. The soil, on analysis, was found to contain all the essential properties to render the most favorable results.

"Sugar-cane has been fairly tested with the Sonora cane. The growth was surprisingly great, and the percentage of juice much increased over the yield at the place from which it was originally brought.

"The sugar-beet promises better results for the future than many of the products already mentioned as prominent in the same direction. Samples not fully matured polarized 17 per cent. With proper cultivation the percentage can be raised to from 20 to 25, and, besides, will harvest two crops each year.

"Wheat does splendidly, but complete data is not at hand from which to compute the average yield. In one instance, however, 483 pounds, seeded to 20 acres, about nine miles east of Yuma, on the Gila river, returned 52,750 pounds, after having been irrigated five times. This was sold in San Francisco, bringing 50 cents per cental over every other kind then in the market. The grain is remarkable for its plump, berry-like appearance. The winter and spring are warm enough to insure a vigorous growth, and cool enough in April and May to allow the heads to fill out without shriveling. It is so perfect as to sell for seed, and, so far as known, is proof against rust. Two crops are raised annually.

"Barley also does well and will produce two crops—the first yielding from 35 to 40 bushels of barley, and the second a large amount of hay.

"Corn is produced in great quantity, yields enormously, and can be grown the year round. The Cocopah corn is noted for sweetness, plumpness, earliness, and for its firm and solid grains. Five weeks after planting, roasting ears are plentiful. This variety commands a ready sale at higher prices than any other kind.

"Alfalfa will cut from five to seven times at an average of two and one-half tons to the acre. Eight acres, but one year old, have this year yielded 74 tons, with more cuttings yet to be made.

"Sorghum, raised for feed, is both valuable and prolific. It frequently reaches fifteen feet in height, yields from 15 to 20 tons per acre, and is worth \$15 per ton. Several crops can be harvested annually.

"Vegetables, kitchen and garden stuff, melons, etc., grow all the year round in unlimited quantity and excellent quality. Some time since a Gila valley farmer planted fifteen pounds of Irish potatoes on a piece of bottom land that had been overflowed, from which he harvested over 700 pounds; and this record, it is believed, has rarely, if ever, been excelled. The sweet potato produces enormously, and equals the choicest brought from South Carolina.

"Peanuts mature rapidly and abundantly, yielding a nut both plump and toothsome.

"Whenever there is sufficient moisture, the natural flora abound in profusion and variety. They are of rare beauty and delicious fragrance, the bulbous plants particularly. The lily surpasses the famous imported 'Japan.' It has been claimed by experts that at no distant period opium will be manufactured from the poppy and attar from the rose, both flowers thriving vigorously. There are but few trees and shrubs capable of adorning the surroundings of a lovely modern home that cannot be satisfactorily grown.

"Every plant, vine or tree mentioned in the foregoing list has been actually proven adaptable to our soils and climate. Many others have been omitted through lack of space, but there seems no doubt that time will demonstrate our ability to profitably raise all the semi-tropic and most of the tropical and temperate productions."

A very manifest advantage possessed by this section is the dryness of the atmosphere, which, as is well known to growers of citrus fruits and grapes, is especially favorable to the perfect development of their products. Oranges will never reach their full measure of sweetness in California where even an occasional fog is seen, and no raisins are so sugary as those grown in localities untouched by the salt breezes of the ocean. From actual demonstration it is known that Yuma County is capable of producing an orange that will more than vie with the products of the Riverside or San Gabriel Valleys, and the lemons grown upon the Blaisdell farm are worthy of being classed with the best upon the hills of Sicily. The warm climate and peculiar characteristics of the soil are especially suitable to the cultivation of the raisin grape; chemical tests having shown the grape to be here possessed of much more saccharine strength than in California, and the cloudless summer making the process of drying a comparatively easy one.

The possibilities of agricultural development in Yuma County have been demonstrated at the ranch of H. W. Blaisdell, about eight miles

east of Yuma. Mr. Blaisdell upon a bare piece of "desert" land has for a number of years been engaged in the cultivation of hundreds of varieties of trees and shrubs with special reference to their adaptability to the locality, and has so improved a thirty-acre tract as to make it one of the sights of Yuma. Irrigating water is furnished in abundance by a well, fitted with a centrifugal pump of a capacity of about forty miner's inches flow. One of the four Agricultural Department experimental stations has here been established, and under the superintendency of Professor Gulley, of the University of Arizona, valuable results may be expected from the critical observation of the details of vegetable growth.

The climate of Yuma County is delightful for the major portion of the year, and during the summer months, though undeniably warm, does not approach that degree of caloric intensity that is usually accredited to the place by those unfamiliar with the whole truth. The blanket story of the Yuma soldier in Hades has given to Southwestern Arizona a notoriety for excessive heat that has without doubt been a factor in retarding its progress. That this impression is erroneous is clearly shown by the following official communication of Lieutenant W. A. Glassford, of the United States Signal Corps, to the Governor of the Territory:

"A few words upon the heat. It is recorded as extreme, yet no one suffers, and sunstrokes are unknown. This is usually accounted for from the purity and dryness of the air. Both are true; but the dryness is, perhaps, the correct reason. I have calculated the difference between the shade and sensible temperature at Yuma during the heated hour of the day, and it is about thirty degrees. At New York or Washington it is only a few degrees, and often identical. The highest shade temperature ever recorded at Yuma is 118 degrees. When the heat is at this point the sensible temperature is about 88 degrees. The shade temperature of New York being 105 degrees, the sensible temperature is certainly near 100 degrees. The difference between the mean temperature and the mean sensible temperature for July is over seventeen degrees at Yuma.

"These considerations of the sensible and shade temperature will account for the absence of any detrimental effect by the extreme heat of Arizona.

"The air is dry. The moisture in the atmosphere is from 25 to 30 per cent, as against 75 to 85 per cent in other localities. Every afternoon in summer there is a refreshing breeze from the Gulf of California that relieves the day of undesirable heat. It passes over a desert, much of which is below sea level, that acts as a dessicant; so that when the plains of Central Arizona are reached the air is dry to the last possible degree.

"There are neither sunstrokes in summer nor pneumonia in winter; neither fever nor malaria live or generate in this section. The air is pure—absolutely free from those compounds that poison the system and bring on disease. In no country is there a greater number of bright nights and sunny days. Hundreds afflicted with lung trouble, after visiting Florida and Southern California, have found relief in this invigorating climate, where the pure air is a tonic to shattered constitutions, a healing balsam to the consumptive."

Following is given a table of average temperature, compiled from the official reports, extending over ten years:

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
53.6	58.8	65.0	69.0	77.2	85.2	92.0	90.9	83.9	72.4	61.2	55.9

The rainfall is practically insignificant. The monthly fall in inches, averaged for eleven years, is given herewith:

Jan	Feb	Mar	Apr	May	July	Aug	Sep	Oct	Nov	Dec	Total
.403	.532	.217	.120	.062	.155	.496	.060	.124	.180	.403	2.752

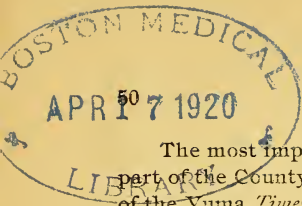
* No rainfall in June.

MINING.

The first mining operations ever conducted in Yuma County were by Colonel Snively on some placers located on the Gila river, about twenty miles from its mouth, in 1858. These are now being re-worked. Excellent placers were found at La Paz, on the Colorado, four years later, and in many of the washes gold digging has been prosecuted with success for many years, during the rainy season. Several millions of dollars have been extracted from the auriferous sands of the County, and the industry is still flourishing. Should any of the many "dry washers" prove effective, there is no portion of the world where their use would become so general and profitable as in Southwestern Arizona.

The major portion of the great expanse of Yuma County, occupying the triangular space between the Colorado and Gila rivers, is occupied by rough, parched and barren mountain ranges, generally of but inconsiderable height. They are unique for the most part in the fact that they rise abruptly, without foothills, from the level plain and have no connection with any other similar elevations. They are buttes, rather than mountains or mountain chains.

As might be imagined, the difficulties of prospecting in these waterless hills are many, yet the research that has been made has disclosed many bodies of ore that will become valuable whenever reached by any adequate system of transportation.



ARIZONA.

The most important mining district is located in the northeastern part of the County, in the Haqua Hala mountains. In a recent issue of the *Yuma Times* the following excellent resume of operations in this district was given:

"The Haqua Hala mines were located on November 11, 1888, by Harry Walton, Robert Stein and Mike Sullivan. C. H. Gray bought Sullivan's interest, Walton sold to R. F. Kirkland and Tom Cochran, and Stein sold his interest to A. G. Hubbard. Two or three other parties acquired interests. About a year ago one Horne jumped the Golden Eagle claim, since which time thousands of dollars have been spent in lawsuits. The principal claims are in two camps, Harrisburg and Bonanza. They are all free-milling gold quartz, and run from \$5 to \$500 to the ton. It is said that Horne took out of one small hole in the Golden Eagle claim \$5000 in a short time. About two months ago A. G. Hubbard and George W. Bowers bought the interest of C. H. Gray in the Bonanza group for \$50,000 cash. The interests of several others were acquired at the same time. Litigation ended and the district took a new lease of prosperity. A twenty-stamp mill was at once contracted for together with the necessary pipe to supply water from a point six miles distant. The mill will be constructed so that forty stamps can be put in if necessary. In addition to the mill will be two hoisting plants capable of working 1000 feet depth. The deepest working at present is 200 feet. The present owners have taken out about \$80,000, and the completion of their mill, water works, road making and purchase of claims will involve an expenditure of \$275,000. It is believed the cost of mining and milling will be about \$3 per ton.

"Harrisburg has a postoffice and several stores. A ten-stamp mill is also located here, which does custom work. The water works supply the needs of both camps. Harris & Bates and Major Clay are among the principal owners. The point of supply for this district has heretofore been Phoenix, but as the distance from Aztec, Yuma County, is only about fifty miles, as against one hundred from Phoenix, supplies are now going that way. The Yuma Supervisors recently authorized some money to be spent in improving the road between Aztec and Haqua Hala and the mine owners also contributed enough so that the road could be put in good condition. There are now employed in this district over one hundred men, which number will soon be increased. Those interested in Haqua Hala have great faith in its future."

South of Haqua Hala is Centennial District, containing many excellent properties, mostly of free-milling gold ore. Water and wood are easily to be had, and an early development is probable.

Up the Colorado river are a number of mineral deposits of large extent, the best developed being in Silver District, about forty miles

north of Yuma. The ores are silver and lead, and somewhat refractory. There is one mill in the district, but it is idle, the ores being brought to Yuma and shipped to a California smelter.

There is no mining boom on in any part of the County, but development is active in all parts. With the accession of an agricultural population along the rivers mining will not be neglected, but will contribute in a most appreciable degree to the prosperity of the County's residents.

SETTLEMENT.

There is but one considerable settlement, the County seat, Yuma, located below the junction of the Colorado and Gila, at the point where the Southern Pacific Railroad enters the Territory from California. It has now about 1200 inhabitants, mostly Americans, of an excellent class. From the issue of the *Yuma Times* of January 1st the following description of the town and its industries is taken:

"Owing to the high prices of lumber the principal building material is adobe (sun-dried bricks), which is well adapted for this climate, where little rain falls. With few exceptions the buildings are one-story, with thick walls and flat roofs, giving a somewhat oriental appearance. The court house is a large one-story adobe building constructed about thirteen years ago. The school district owns a fine, large lot, but the present building is too small, and will no doubt be replaced by a roomy brick building soon. The Catholic is the only church organization represented with a building, and has also a convent school conducted by the Sisters of the Sacred Heart. The Ancient Order of United Workmen is the only secret benevolent order having an organization, and it also owns a comfortable building containing a lodge hall.

"The Southern Pacific Railroad Company makes Yuma its division headquarters for this portion of its line. It has a large freight yard and keeps great quantities of road supplies, such as ties, rails, coal and ice. The company also owns the water-works, which supply its own needs and a good part of the town. A pumping plant on the bank of the river keeps a large reservoir filled, where the muddy water of the Colorado settles and becomes clear and sweet. The company has a twelve-stall round house, freight depot, cottages for employees, also a reading-room for employees, together with water tanks and a number of other buildings.

"The Arizona Territorial Penitentiary is located at Yuma and disburses between \$50,000 and \$60,000 a year in the town. This institution is located on high ground, having the Colorado on the north side and the Gila on the east. About three acres of ground have been leveled off

for the necessary buildings. The buildings are made of stone and adobe and are surrounded by a high, thick wall of the same materials. Outside the walls are the superintendent's residence, office, stables, etc. The prison has its own water-works and electric lights. The average number of prisoners is about 150. Blacksmith and machine shops, carpenter shop, tin shop, shoe shop, tailor shop and laundry, together with grading give employment to the men most of the time. Many of them have become very skillful in the manufacture of fine laces, canes and inlaid woodwork. A proposition is now on foot to employ prison labor in preparing wild hemp for market. This plant grows wild over thousands of acres south of Yuma and has a fibre superior to manilla.

"Yuma carries on considerable trade with the country to the northward by means of the steamers of the Colorado Steam Navigation Company. The business is carried on with two large steamers and a number of barges. Monthly trips are made as far north as El Dorado Canon, in the State of Nevada, 600 miles from Yuma. At Needles connection is made with the Atlantic and Pacific Railroad. Steamers take provisions, mining machinery and various supplies to the different points and take away their bullion and ores. A voyage up the Colorado is a delightful recreation and can be recommended to those who are tired of the worn out lines of travel. The scenery is magnificent, and many places of interest can be seen.

"Yuma is a port of entry and a custom-house is maintained, though little business now passes through it.

"Nearly every branch of business is represented in Yuma. Everything in the necessary line can be obtained at reasonable prices, considering our remoteness from general markets."

There are two able weekly newspapers published. The *Yuma Sentinel* was the pioneer of such enterprises in Arizona, having been established in 1871. It is published by Hon. John Dorrington. The *Yuma Times* is a sprightly sheet that made its appearance a year ago, and appears to prosper under the management of the Yuma Publishing Company.

Ehrenburg, in the northwestern part, in early days was the ferrying point upon the Colorado river for the greater portion of the traffic of Northern and Central Arizona, but since the coming of the railroad, has lapsed into a small mining hamlet. The canal operations in the Gila Valley have caused the starting of a few stores at different points along the Southern Pacific, but they can as yet hardly be termed any more than stations.

A description of the county would not be complete without a reference to the Yuma Indians, who in sparse raiment form an important and picturesque feature of the landscape. They are as peace-

able as a like number of whites, and, though not energetic, except when in chase of the fleeting jack-rabbit, are not averse to earning an honest quarter-of-a-dollar by the performance of the many odd jobs around the local residences. They live along the bottoms of the Colorado river for many miles, a large reservation occupying the north-western part of the County, set aside for the benefit of the Yumas, Mojaves and Cocopahs. The latter tribe are far superior to the generality of the Territory's Indians. All are self-supporting.

The town of Yuma is ambitious in the extreme, relying much upon her position, at the "Gateway of Arizona," for future prominence. In addition to the railroad it now has, there is a line projected to connect the Atlantic and Pacific with the Southern Pacific, another to Silver District, another to Port Isabel, on deep water at the mouth of the Colorado, and another, the Cuyamaca road, from San Diego. The last named is now in process of construction, and there is little doubt of its completion within a few years. It is proposed to extend it, on the line of the old Scott survey, up the Gila and Salt rivers, through Phoenix and eastward to Silver City, and the project may eventually be consummated.

But, aside from these, the capabilities of the County for agriculture will alone place her upon a high plane of prosperity, and upon the tillage of the soil does she found her greatest hopes for success.

MARICOPA COUNTY.

THIS County occupies an 7-shaped expanse of 9354 square miles in the south-central portion of the Territory. In point of population (about 12,000) it ranks next to Pima, with Yavapai very close behind. In wealth Maricopa leads, having taxable property to the amount of \$5,583,214.30. This sum is assessed upon an acreage of 274,308, upon land improvements to the amount of \$305,875, with city property and improvements valued at \$1,730,635. Another important item is 23,843 head of cattle, assessed at \$231,069.30.

The history of the County need be but a brief tale, the settlement of its lands dating no further back than 1868. In that year Jack Swilling, a famous frontiersman of the time, left the Weaver placer mines and headed a small party in locating farms a few miles east of where Phoenix now stands, and in excavating a ditch to bring water from the Salt river for the irrigation of their small claims. This nucleus grew

rapidly, necessitating the organization of the County of Maricopa a few years later, from the southern portion of Yavapai County. Since then the Counties of Pinal and Gila have been formed largely from Maricopa, leaving it in its present form.

In its topography the County is, for much of its area, mapped out as a plain, sloping toward the Salt and Gila rivers. This great plain is broken by numbers of short mountain ranges and detached buttes. On the north the beginning of the high plateau of Northern Arizona is marked by the outlying mountains of the Bradshaw range and by the Cave Creek hills. On the east, beyond the line of the Verde river, rise the rugged Superstition mountains and the lofty Mazatzals.

Through the center of the County flows the Salt river, mingling its flood with that of the Gila about twenty-five miles southwest of Phoenix. The two valleys are continuous and in them, watered by the two streams, lies nearly all the agricultural land of the County.

AGRICULTURE.

However blessed with capabilities in other directions, the tilling of the soil is and ever will be the foremost industry of Maricopa County. The fame of the marvelous Salt River Valley is extending to every portion of the Union, and year by year advancement goes on at a rate that will soon make of this region the garden spot of the world. By the courtesy of the Phoenix Chamber of Commerce, the writer has been furnished with an extensive description of the County's agricultural wealth, from which he is pleased to quote.

The valley of the Salt river contains one of the largest bodies of irrigable land in the United States—over one million acres. Its surface is almost as level as a table. It is walled in by rugged mountain ranges and is watered by Salt river, which flows through its center.

This magnificent vale has been exceptionally blessed by the bounteous gifts of nature. The soil is one of the richest to be found in the United States. Near the river it is, in places, a dark alluvial mold, well adapted for the production of cereals and grasses. Further back it is a rich loam of extreme fertility, while nearer to the foot-hills the soil has something of a lighter and more porous character, being especially adapted to the cultivation of every variety of fruit. It has been demonstrated that this rich and productive soil has a depth of from ten to forty feet throughout the entire valley, and although portions of it have been cultivated in the same crop for twenty-one years, there is no diminution in the yield or exhaustion of its durable fertility. The water used for irrigation constantly gives new life to the land.

"What," you will inquire, "are the productions of this fine valley?" Everything grown in the temperate zone and semi-tropical climates. All of the cereals and grasses indigenous to the temperate zone; every fruit that ripens under semi-tropic suns. Among the fruits produced in the Salt River Valley are the following: Oranges, lemons, quinces, apples, pears, nectarines, peaches, apricots, olives, almonds, strawberries, grapes, figs, plums, dates.

Of cereals and grasses, the valley produces the following: Wheat, oats, barley, rye, corn, buckwheat, cotton, tobacco, broom corn, hemp, flax, sugar-cane, alfalfa, blue grass, millet, timothy, clover.

Besides the foregoing, vegetables of every kind give a most prolific yield.

Briefly, such is the Salt River Valley of Arizona, a land of wonderful fertility, manifold in its productions and bounteous in its return for the labor bestowed. It may not inaptly be termed a beautiful oasis in a dreary desert, which stretches between the cornfields of Kansas and the groves and vineyards of Southern California.

Of the one million acres embraced within the limits of the valley, not more than one hundred and twenty-three thousand acres are at present under cultivation.

This area is divided as follows:

	ACRES.
Barley.....	40,000
Alfalfa.....	45,000
Wheat.....	15,000
Vineyards and orchards.....	11,200
Miscellaneous products.....	10,000

Two to five crops a year can be produced in the valley, and so rapid is the growth that the labor of the cultivator is reduced to a minimum. The planting season begins on the first day of November, and the grain harvest is ended by the first of July. The climate, it must be remembered, is almost perpetual spring and summer; snow never falls, and frost is rarely seen. Roses are in bloom, fruit trees are blossoming and the grain fields are a sea of green, when the lands of the Eastern farmer are covered with ice and snow. Sugar-cane and the cotton plant seem indigenous to the Salt River Valley.

One of the most valuable productions of the Salt River Valley is the forage plant known as alfalfa, or Chilean clover. In the warm, dry climate of this region its yield is somewhat phenomenal. It is cut from four to five times a year, yielding on the average two tons per acre to the cutting. Whether cured as hay, or in its green state, it

is unexcelled as feed for horses, cattle and hogs, and other livestock, its fattening qualities not being equaled by any cultivated grass or known forage plant.

Horses, cattle and hogs find a genial home in the rich alfalfa pastures of the valley. Summer and winter, autumn and spring, they crop the nutritious feed, or rest contentedly in the shade of the leafy cottonwood. In a region like this, where men go about their daily avocations in their shirt sleeves during the entire winter, the housing of cattle is entirely unknown. Hogs run on the alfalfa fields until the harvest is over, when they are turned on the stubble, which in a short time puts them in prime condition for market. Beef fattened on the alfalfa pastures is tender and juicy, and is almost equal to the stall-fed article of the Eastern States. California receives a large portion of its beef supply from this region, and many thousand head of cattle are annually shipped to Kansas City, Missouri.

When the stock-grower has fenced a tract of land, planted it in alfalfa, and set out cottonwood shade trees, his labors are nearly at an end and his expenses become merely nominal. Cattle that are pastured on the green fields six to eight weeks are ready for the butcher at all seasons. Each acre of alfalfa properly cared for will support two head of cattle or horses, or twenty head of hogs during the entire year.

Within the past three years some of the purest breeds of the equine race have been imported from the far-famed blue grass region of Kentucky and other sections of country, and today the City of Phoenix and the surrounding country can show as fine a breed of horse flesh as any place of like population in the Union. The soil, climate and feed are all that could be desired, and the valley will yet become famous for its fast stock. Horses and cattle three years of age have attained their full growth.

The natural stock ranges throughout the Territory have been so heavily stocked for a number of years that they can no longer turn off cattle fit for beef, hence the cattlemen rely entirely upon the alfalfa fields of this valley to put their cattle in condition for market.

While capable of an almost unlimited variety of productions, it is in the cultivation of fruits that this valley must look for its greatest prosperity. With the exception of some favored spots in California there is not a region between the Atlantic and the Pacific that possesses so many natural advantages for the prosecution of this industry. Shut out from the fogs and mist of the sea coast, its pure, dry atmosphere has all the desirable qualities for the growing, ripening and curing of high-priced semi-tropical fruits. The soil is natural fruit land, and has all those ingredients requisite for its production. Owing to the

more rapid growth of vegetation the fruits of the Salt River Valley are ripe and ready for market from two to four weeks earlier than those of California. This gives the Arizona producer an immense advantage over his competitor of the Golden State, and enables him to dispose of his entire crop free from competition. It may appear like sending coals to Newcastle, but it is a fact that the Salt River Valley has for several seasons past shipped apricots to Los Angeles a month before they were ripe in that city. Of this the *Los Angeles Times* speaks as follows: "Prophet Potts left at the *Times* sanctum yesterday a little box of ripe apricots. They are a full month earlier than those which ripen here, and were grown in the Salt River Valley, near Phoenix, Arizona. * * * The prospects, in view of the Salt River Valley development, are that Arizona will some day send back a Roland for our Oliver, supplying this section with early high-priced fruits."

The yield is something unprecedented. The fig gives two and sometimes three crops a year. This tree, whose cultivation is successful in so few places in the United States, thrives wonderfully here, and grows almost as strong and vigorously as the native cottonwood. Cuttings set out have borne fruit within three months, the fruit being large, rich and luscious. The White Adriatic variety is the most popular, and is as much at home as on the hills of its native Dalmatia. Figs grown and packed here have been pronounced by experts in the eastern markets to be most perfect; equal in every respect to those grown in Smyrna. There are but very few places in the world where the fig of commerce is successfully produced; and the perfect success attained here in its production will render this valley famous throughout the civilized world. It is destined to be one of our principal and most profitable industries. It is a much more profitable crop than the orange. The largest fig orchards in the United States are in this valley.

Phoenix dried figs won a first premium at the recent Mechanics' Fair in San Francisco, and Arizona raisins have been received with strong commendations whenever exhibited. This is really the first year that an effort has been made to pack either figs or raisins in first-class marketable shape, and the result has been gratifying and profitable to the packers.

No spot on the Pacific Coast is better adapted to the cultivation of the grape. Cuttings will bear in eighteen months, and two crops a year from the same vines is a common occurrence. The yield of vines in full bearing is from four to eight tons per acre. The chief varieties planted thus far are the Muscat of Alexandria, Zinfandel, Sultana and Tokay; all other varieties, however, do equally as well. The attention

of experienced fruit growers in California has recently been attracted to the great natural advantages of this valley for the production of the raisin grape. Few places in the world are found adapted to its successful culture. The drying and curing of the fruit requires, above all else, a warm, dry climate, which this valley possesses to a perfect degree. If the reader will consider that fully 50 per cent. of all the raisins consumed in the United States are imported, he will understand what the profits must be when they are produced at home.

Oranges have not yet been extensively planted in the valley, yet we now have about two hundred acres in perfect condition in their second and third year, which demonstrates beyond a question of doubt that they can be successfully grown here.

To make special mention of every variety of fruit named is beyond the compass of this publication. It may be said that each and all grow strong and thrifty and give a bounteous yield. With the advance of land values it is only a question of time when nearly all of this grand valley will be devoted to the production of high-priced citrus and deciduous fruits.

Presuming that the reader has followed us thus far in our efforts to describe the resources and attractions of the Salt River Valley, he is apt to inquire, "How is it that you produce such bounteous crops of cereals, grasses and fruits in a region so proverbially dry as Arizona and with so slight a rainfall?" The answer is a simple one—"By the aid of irrigation."

Irrigation brings life and verdure and beauty and productiveness to plant and tree and shrub and flower. By its agency the barren desert is made to blossom and yield its wealth of grains and grasses and fruits; it makes of the desolate and worthless plain a blooming garden; it brings value to the land formerly given over to the cactus and coyote. Like the magic wand of Moses, it causes the life-preserving streams to come forth, carrying in their wake wealth and lasting prosperity. To Arizona irrigation is what the life-blood is to man, or the piston-rod is to the steam engine. The farmer and the horticulturalist must rely entirely upon it for success, and upon its proper application to the thirsty soil depends the future tillage in this Territory.

To the eastern agriculturalist, where such a system of cultivation is unknown, the term carries a vague and indefinite meaning. A few words descriptive of this method of tilling the ground may not prove uninteresting,

Irrigation is the oldest system of cultivation known to man. In those eastern lands which were the cradle of the Aryan race, it was practiced long before the dawn of history. The mighty empires of

antiquity which flourished in Asia and Africa depended almost entirely upon irrigation for the production of crops. Canals and waterways made of the now desolate Syria, Mesopotamia, Asia Minor and Persia, the garden spots of the ancient world; and today nearly all of the Levantine countries owe their prosperity to the same system. More than two-thirds of the human family have pursued this mode from time immemorial, and will continue to do so as long as the present climatic conditions remain unchanged.

Briefly, irrigation is the artificial application of water to the soil. Canals and ditches divert the water from the river-bed and convey it to the land which it is desired to irrigate; lateral ditches run from the main canal, carrying the precious fluid to all parts of the cultivated area. Sometimes the entire field is flooded to a certain depth, which is usually the manner of irrigating grains and grasses, but for fruit small ditches are opened near the trees and vines, through which the water runs and soaks to the roots. When the orchard, the vineyard or the field require moisture, the cultivator has but to open the gate in the side of the main ditch and conduct the water to the desired spot, and after thorough saturation the gate is again closed. It has been well said, the irrigator is independent of the clouds and can supply his fields whenever and as often as they may require.

In the Salt River Valley there are at present eight main canals, having an aggregate length of about 190 miles, and a carrying capacity of 117,000 miners' inches. In explanation it may be said that a miners' inch is that quantity of water which flows through an inch square orifice, under the pressure of four inches. Forty of these inches make a cubic foot per second. The cost of these water-ways is something like \$1,000,000, and the area they inclose is about 400,000 acres. The "Arizona" is the largest of these canals. It is forty-one miles in length, thirty-six feet wide on the bottom and fifty-eight on top, having an average depth of seven and one-half feet and a carrying capacity of 40,000 miners' inches.

Irrigation is the most perfect method known to men and the land so cultivated commands the highest price the world over. The delta of the Nile, the plains of Lombardy and Castile and the valleys of Southern California bear testimony to this fact. The process is one easily mastered, and for the extra labor expended the return is five-fold. Improved land with water rights can be bought at \$25 to \$50 per acre.

The canals in the County are as follows:

CANAL.	MILES IN LENGTH.	ACRES RE- CLAIMED.
Arizona.....	41	50,000
Grand.....	27	.....
Maricopa.....	26	45,000
Salt River Valley.....	26	.....
Tempe.....	19	25,000
Highland.....	22	18,000
Mesa.....	9	13,000
Utah.....	6	10,000
Farmers.....	5	21,000
Total.....	181	182,000

These canals are in the Salt River Valley, while on the Gila are the following canals:

CANAL.	MILES IN LENGTH.	ACRES RE- CLAIMED.
Buckeye.....	30	20,000
Palmer.....	22	12,000
Enterprise.....	12	6,000
Gila River.....	8	5,000
Citrus.....	14	5,000

The acreage in crop this year under the Arizona, Maricopa, Grand and Salt River Valley canals is 50,000 acres, consisting of:

Alfalfa, about 11,500 acres; orchards and vineyards, 3,000; grain 35,000. There have been raised under these four canals this year about 35,000,000 pounds of grain, and about 184,000,000 pounds of alfalfa. Of the 3000 acres in fruit, 200 acres are in oranges. There are 25,000 acres in crop under the Arizona alone, leaving about 25,000 acres under the other three.

There has been a great deal of land under the Tempe canal cultivated in wheat and barley together. The yield from this the present year under the Tempe canal was 2,420,000 pounds. The yield of barley was 2,835,000 pounds. The acreage in alfalfa was 7395. There were about 20 tons of peaches raised at Tempe, or, rather, under the canal, and about 10 tons of apricots. The grain, according to the best authorities, averages about 1200 pounds to the acre.

The Mesa canal has under it 8000 acres in cultivation, of which 3000 acres are in alfalfa, 2000 acres in vines, 500 acres in trees, and the remainder, viz: 2500 acres, is in grain. The grapes average 2½ tons to the acre, and the grain has run as high as 18 sacks to the acre.

Under the Highland canal there are 7680 acres in cultivation. Two thousand two hundred and forty of this is in alfalfa, 20 acres in fruit, and 5420 acres in grain.

The north side canals of the Salt River Valley are, with one exception, tributary to the Arizona canal, which has its head at the red sandstone McDowell Butte, twenty-eight miles above Phoenix, a short distance below the junction of the Salt and Verde rivers. On the south side of the river the canals all have independent heads, although a scheme is now being pushed looking to a consolidation of all the canals with a head nearly opposite to that of the Arizona canal. By this arrangement one bed-rock dam could be made to do service for both sides of the river, distributing the water with the least possible waste and saving the large expense of yearly repairing the different dams of the several canals.

As is the case in Yuma County, there are thousands of acres of mesa lands, unexcelled in quality, that could be cultivated was there a constant summer supply of water in the river. During the months of June, July and August, the river now carries but little more than enough to irrigate the lands already under ditches. In view of the reclamation of these outlying lands, a survey was ordered by the Board of Supervisors, with a view to locating suitable sites for water storage dams. A number of good locations were found, but none that could approach a site at the head of Salt River Canon, just below the mouth of Tonto creek, almost exactly on the line between Gila and Maricopa Counties. Here the gorge is but 200 feet wide and a dam 200 feet high would form a V-shaped lake in Gila County, twenty-six miles long by an average of two miles wide. The immensity of such a body of water can scarcely be comprehended, and it is possible a dam one-half the height would impound more than enough water for all possible necessities. However vast such a reservoir might be considered, it would be the work of but a short time for the streams above to fill it at the time of melting snows in the spring.

Another storage enterprise is projected for the irrigation of the extreme northern part of Salt River Valley. A tract of land of 180,000 acres, now worthless for lack of water, is to be irrigated by means of two reservoirs in the Agua Fria channel.

Continuing down the river from Phoenix, the country is found in a somewhat crude state, many of the canals being on paper only. The Buckeye Canal on the north side of the Gila, heads a short distance below the junction of the Salt and Gila. It now waters several thousand acres of cultivated lands, but is to be soon enlarged to a capacity of 50,000 miners' inches, and extended to the rich lands beyond the Hassayampa.

On the south side, below the dam of the Buckeye but a short distance, is the head of a projected irrigation enterprise of great magnitude, a company planning to appropriate 100,000 miners' inches from the Gila and conduct the water by means of a very expensive canal to the lands lying south of Gila Bend.

A few miles below this enterprise, at a point where the Gila takes a turn to the south around the extreme western point of the Sierra Estrella range, is the head of the Gila Bend Reservoir and Irrigation Company's Canal. About twelve miles of canal has already been constructed and operations are in progress on the dam. This is an excellent point for a dam by reason of the nearness of bedrock to the surface and the closeness with which the hills on either side approach the stream. The canal is designed to irrigate 80,000 acres of land, which, by reason of its contiguity to railroad transportation will no doubt be very valuable at no distant date.

A number of other canals are to be found on both sides of the river, irrigating the lands near the river, to the Yuma County line, though the number of cultivated holdings is as yet inconsiderable.

This section of country has an advantage not to be despised in that of the vast amount of water poured into the lands of the upper valley in the neighborhood of Phoenix, much eventually finds its way back to the lower river through the substratum of gravel to be found under the whole valley.

Irrigation by means of wells and centrifugal or vacuum pumps is being considered with more attention yearly by those farmers on whose lands water can be reached at a depth not exceeding fifty feet. A fifty-inch "plant" of engine and pump can be put in readiness for working for about \$750, and in many respects the system is considered preferable to irrigation from canals. Certainly, when mesquite wood is to be obtained for \$3.50 a cord, as it can be here, the expense would not exceed the present canal costs. In many parts of the valley water is to be found in inexhaustible quantity at a depth of from ten to twenty feet and taking water from the ground to put upon the ground is, surely, what might be termed an indefinite extension of the water supply. To show the amount of water contained in the gravel substratum it might be instanced that at the well of the Phoenix Water Works Company, three miles from the river, a centrifugal pump ran its full capacity of 110 miners' inches for forty-eight hours without visibly affecting the water level. The well now supplies the whole City of Phoenix,

CLIMATE.

Although Arizona has an unenviable reputation abroad for the caloric propensities of its temperature, this, like many other statements relating to the Territory, is very much exaggerated. To be sure, the

thermometer sometimes goes above 100 degrees during the months of June, July and August, but so pure in quality and free from moisture is the air, that people here feel the effect of such heat much less than do the residents of the Eastern states when the mercury marks 85 or 90 degrees. For nine months of the year the climate of this valley is unsurpassed; there is scarcely a day without its bright sunshine, and under a pair of blankets one can rest comfortably in the open air during every month of the winter. As has been stated before, snow never falls in this region, the nearest approach to it being a light frost which occasionally visits the valley during the months of January and February. The average mean temperature of Phoenix ranges from 55 degrees in January to 85 degrees during July. This is lower in summer and higher in winter than that of the the San Joaquin and Sacramento Valleys of California.

The praises of the climate of the Golden State have been published the world over; its salubrity, healthfulness and equable quality have been so thoroughly advertised that it has, and is, drawing an immense immigration to that commonwealth; and yet, it is a fact, that in all the qualities mentioned, the Salt River Valley region can fairly lay claim to superiority. Shut in from the fogs, mists and cold winds, so prevalent along the sea coast, it is not subject to those sudden changes which is such a great objection to the California climate. It has, to a marked degree, that dry, pure, bracing, health-giving quality natural to all regions with a limited rainfall. Those who have passed their lives under the leaden dome, the rains and snowstorms of Northern winters can scarcely conceive of the luxury of existence in a land with bright sunshine, balmy air and cloudless sky every month in the year. Here is a region where spring and summer hold joint reign, where health welcomes the afflicted and where strength awaits the weak and debilitated. There is no spot in North America with a climate so conducive to the curing of lung diseases; this fact has already been fully demonstrated in many cases.

MINING.

The mountains that rise so abruptly on the edges of the Salt River Valley hold many rich mineral treasures. On the northwest the great Vulture ledge has world-wide celebrity. In the first few years following its discovery it is said that nuggets of gold "by the wagon load" were picked up from the surface of the ground, and for about twenty years the property has been successfully worked. It is not in operation now, though well equipped with a 100-stamp mill. There are vast quantities of low-grade ore on hand, however, and, with every facility for its reduction at the least possible cost, there seems to be no adequate reason why the mine should not be in vigorous and profitable operation.

In the mountains back of Vulture are many excellent prospects, carrying gold, silver and copper, but a lack of water makes their working difficult and expensive. In the extreme northwestern corner of the county are some copper properties of high-grade ore that are now being vigorously developed.

East of Vulture, upon the Agua Fria, near the mouths of Castle Creek and Humbug Creek are placer banks, upon which operations have just begun. In this connection it might be stated that there are many small mountain streams, in the northern part of the County whose sands carry gold in not inconsiderable quantity.

About fifteen miles north of Phoenix is the Winifred District, the chief mine in which, the Union, is now shipping ore and concentrates to Eastern smelters.

In Cave Creek District, a few miles eastward, there are hundreds of prospects and dozens of good mines. Of these the Phoenix is the most important. On this property a 20-stamp mill is kept in constant operation, and it is the intention of the management to add eighty stamps to the plant and drive the whole by means of water power secured by means of a pipe line from a point several miles up Cave Creek. The ores of the District are diversified in character, being free milling at the surface, running into sulphurets as depth is attained. In the Superstition mountains are many large free gold ledges, several of them being worked with profit in a crude sort of way with arastras. In the Salt River mountains, the Sierra Estrellas and the White Tank mountains are also good deposits of gold, silver and copper ores, though but little development has been done upon any of the claims.

A red sandstone of a superior class is abundant near the line of the Maricopa and Phoenix Railroad, a few miles east of Phoenix. It is easily quarried and worked, and hardens on exposure to the air. There are several quarries of it, the quantity in sight is without limit, and it is probable that here an important industry will be established.

Although lime of a superior quality crops out all around the Salt River Valley, there is at present no kiln in operation, the lime used in construction coming wholly from California. There is an excellent opening here for skilled lime burners, as ledges of the best quality crop within six miles of Phoenix. Incidentally it might be observed that the pale blue limestone merging into what might be called marble, lies in such a shape that it might be profitably quarried for building stone. It would make a beautiful contrast, if combined with the sandstone, in one structure.

SETTLEMENT.

Nearly in the center of the Salt River Valley is situated the flourishing city of Phoenix, the county seat of Maricopa County, and

the capital of the Territory. Its present population, including suburbs, is about 6500, and is rapidly increasing. Surrounded by a wealth of flowers, fruits and foliage, it is one of the handsomest towns in the Southwest. Through the streets flow streams of pure water, while rows of handsome shade trees line both sides of many of its thoroughfares. So dense is this forest of verdure that the traveler approaching it from any direction will not see the houses until he is fairly within the town. The streets are wide and level, facing the cardinal points. The buildings, which were formerly adobe, are now nearly all of brick and wood; those erected during the last year being entirely of the latter materials.

Washington street, the principal thoroughfare of the city, is three miles in length, lined on either side for several blocks by handsome business houses. The City Hall is a handsome three-story brick building. It is situated in the center of a plaza three hundred feet square, and is surrounded by a blue grass lawn, ornamental shade trees and flowers. The Court House is likewise an imposing brick structure, and occupies a block three hundred feet square, similar to that of the City Hall. There are three commodious and elegant public school buildings in the city.

The attendance averages about 450 pupils. Several private schools are also well attended. At the northwestern corner of the city the Methodist Church will soon commence the erection of a large college, nearly all financial preliminaries having been completed. Arrangements are being made to start within a few months an Indian school near the city, when several hundred aborigines are to be instructed in the peaceful arts.

In Phoenix the Methodists have two places of worship; while the Catholics, Presbyterians, Baptists and Episcopalians have handsome structures devoted to religious purposes. The secret societies are well represented; there are lodges of Masons, Odd Fellows, Knights of Pythias, Ancient Order of United Workmen, Grand Army of the Republic, Chosen Friends and Good Templars. There are three daily newspapers, the *Herald*, *Gazette* and *Republican*, each of which issues a weekly edition.

Phoenix is lighted by gas and electricity, and is supplied with street railroads and water works. It has a well organized and efficient fire department. There are two manufactories of artificial ice; three planing mills, one flouring mill and four banks. There are good hotels, and many good lodging houses. Business of every description is well represented in Phoenix; and it being the natural trade centre of an extensive region, has a large and steadily growing traffic. During the past year a number of fine brick structures have been erected, and the work o

improvement goes on without intermission. Phoenix is connected by rail with the Southern Pacific road, and additional railroad connections will soon be had with the Atlantic & Pacific road, thus giving the advantages of competition both East and West. A good toll-road is completed into the heart of the Bradshaw mountains, that will bring to Phoenix a large amount of mining business. Excellent highways lead off in every direction, radiating to Phoenix as do the spokes of a wheel to the hub.

Three miles east of the city is the Territorial Insane Asylum, a model institution of the class. To the west of the city are the capitol grounds, highly improved. No start has been made upon a building as yet, but an appropriation to that end is expected at the next session of the Legislature. In the lack of a capitol building, the upper floor of the City Hall is given over to the Legislature, and the main floor is, for the most part, occupied by the offices of the Governor and Secretary of the Territory.

Tempe is located on the south bank of Salt river, nine miles east of Phoenix. Its position is clearly marked in the valley by a tall butte, at the base of which the town lies. Before the coming of the railroad it was but an inconsiderable village. Today it claims a population of over 1000, with a thickly settled agricultural country surrounding it. There are a number of fine brick business blocks, two Methodist, a Baptist and a Catholic church, etc. There is a bank, several hotels, five general stores, a drug store, hardware store, two lumber yards, two livery stables, and the various other business establishments necessary in a thriving town. There are several public halls. Secret societies are represented by the Odd Fellows, Ancient Order United Workmen, Grand Army of the Republic and Good Templars. Three attorneys and notaries public appear to find occupation. The chief manufacturing industry of the place is a large flouring mill, the product of which is marketed for the most part in the southeastern part of the Territory.

The exports of Tempe are perhaps greater than any other town in the Territory. Many carloads of hay and grain daily leave this point, and owing to light crops in California, large shipments of these staples have been made westward this season. Large shipments of fat cattle have also been made. The cattle for the most part were range steers, brought down from the mountains in the summer and fed for several months on the rich alfalfa fields of the valley.

About eighty tons of honey have been forwarded during the year to eastern points by the Bee-keepers' Association of Maricopa County. The organization succeeded in disposing of all the surplus honey of the valley at lucrative prices. It finds a ready sale, being uniformly classed as of the finest quality in the market.

Several carloads of dried peaches and grapes have also been shipped during the last few months to Chicago. Owing to the lightness of the peach crop in the East, the price obtained for the dried article in Tempe was 12½ cents per pound.

Though every grain and alfalfa farm has its few fruit trees, there are no orchards of any considerable extent near Tempe, the fruit mainly coming from the mesa lands farther up the river. A large colony, however, has purchased several sections of land a short distance from the town, and upon twenty-acre tracts will enter entirely upon the growing of fruit. That they will succeed is beyond doubt.

Tempe is especially notable as the site of the Territorial Normal School. This excellent institution is situated on the outskirts on a twenty-acre tract, donated by the citizens. The building is well adapted for the purpose and for the climate. The school is under able management, and is filling in the most satisfactory manner a field of broad usefulness. It is deemed eminently proper that Arizona's teachers should be trained at home, from among Arizona's people. The present attendance is about fifty students, averaging perhaps 19 years of age, and representative of every portion of the Territory. Under the vigorous impulse the school has received during the last year, it is confidently expected that the number of pupils will be increased next term to fully 100, and that before long the annual demand for teachers may be entirely supplied from this source.

Two public schools, with an attendance of over 100, furnish instruction to the youth of the town, and in the farming country near by are five more schools, well filled and well administered.

A weekly newspaper, the *News*, finds here a lucrative field.

Mesa City lies away from the railroad, about eight miles east of Tempe. It is a lovely spot, improved, perhaps, to a point beyond any other agricultural section of the Territory. Originally established as a Mormon colony, there are a large number of Gentiles holding homesteads in the vicinity. The "city" is simply a cluster of residences near the postoffice and public school, the townsite being given over almost entirely to orchards and vineyards. The light, calcareous soil of the mesa appears especially adapted to the growth of both tree and vine, and magnificent results have been attained in the short twelve years since the founding of the colony. Citrus fruits have been but little tried, though there is no doubt that their culture would be successful. There is a distillery here which makes a creditable article of brandy, and the manufacture of wine has been attended with some success. It would seem as though the manufacture of dry wines and light clarets will ever be impossible in Arizona, owing to the high degree of

saccharine strength contained in the grape. It is to be deplored that efforts have heretofore been confined almost entirely to the manufacture of claret. There is not the slightest doubt that sherry, port, muscatel and other full-bodied wines could be made to the highest degree of perfection. There is room for improvement, too, in the grapes, Mission and Zinfandel being the main varieties now grown. In table grapes, the Muscat of Alexandria takes the lead. It grows vigorously and clusters well. As a raisin grape it has no superior, though until this year little effort has been made toward packing it in attractive shape. Preparations are being made, however, for a fruit packing establishment on a large scale, and next season it is probable that Mesa raisins will take a place not inferior to those packed in the vicinity of Phoenix. A roller flouring mill is being erected here and will be in operation by the middle of the year. Mesa's school facilities are of the best, and the attendance is second in the county only to Phoenix.

Lehi is a small settlement, north of Mesa, on the river bank. It has a Mormon population, employed, for the most part, in fruit-raising.

Fort McDowell, formerly a flourishing cavalry post, was abandoned a few months ago, and it is probable that the reservation will be opened for settlement at no distant day. There are several thousand acres of excellent land lying along the Verde river, contained within the reservation, and it is probable that a farming community will keep a village in existence at this point.

Buckeye, thirty-five miles southwest of Phoenix, is a settlement existing, for the most part, in hopes for the future, for if the extension of the Buckeye canal is carried forward there will undoubtedly be at this point a town of no mean size. There are now established a hotel, store, blacksmith shop, butcher shop, etc. A lively weekly journal, the *Blade*, voices the capabilities of the section.

Gila Bend, on the Southern Pacific Railroad, is important in being the supply point for a large extent of farming country along the Gila river, and for the Gunsight and other mining districts in Pima County, from forty to seventy miles distant. There are several stores, a hotel, etc., and it is likely that the settlement will yet grow into a town of considerable size. Indeed, already is there talk of another County, with Gila Bend as the County seat.

ARCHÆOLOGY.

Nowhere in the Territory are the remains of a prehistoric era more distinct or abundant than in the Salt River Valley. The ruins of a half dozen great cities are conspicuous, and the lines of the irrigating canals of the ancients can be traced over the level lands for miles.

The researches of Frank Hamilton Cushing, representing the Smithsonian Institute, have cleared up much of the mystery that had for years surrounded these ruins. It is now established beyond dispute that the ancient inhabitants of the valley were Toltecs, the race that preceded the Aztecs and who were the builders of the grand temples that yet rear their heads in Mexico and Central America. The Zuni tribe in northwestern New Mexico are descendants of these olden people and the customs of their pueblo civilization are today in striking similarity with many of the evidences of religious peculiarities unearthed in Arizona. They lived in adobe or cement houses, often of two or more stories in height. Their main castles or temples were of grand size, defended by walls and towers. Their system of government would seem to have been a theocracy, similar to that of the Jews after the Exodus. They wove cloth, a few fragments of which have been preserved in clay. Of metal they seemed to know but little, though irregular pieces of copper have been found. They wove baskets and made pottery with much skill and an evident appreciation of beauty. That they were possessed of some engineering skill is evident from the manner in which their canals, several of them of great size, keep steadily to the line of their gradient. They cremated the majority of their dead, burying the ashes in earthen jars in family cemeteries, under about a foot of earth. In exceptional cases, burial or, rather, entombment, was practiced, over a hundred skeletons having been found, neatly walled up within the larger houses. Several were saved in their entirety with great care and forwarded to the Smithsonian museum. From the evidence of their bones, the ancients were of tall stature, and their skull formation was similar in nearly all respects to the best type of Caucasians. What caused their departure would be as difficult a problem to solve as the date of their existence here. That they were a peaceful, industrious, agricultural people is evident and the evidences at hand are that they were possessed of much skill and intelligence, and wrought great works with the assistance of only the rudest tools of slate, basalt and obsidian.

The Indians of the present day know nothing of these ancient races, saying that their forefathers came from the North, and that they found the ruins about as they are now.

There are several thousand Pimas, Papagoes and Maricopas within the County. They are industrious and wholly support themselves by the raising of wheat and corn. The suggestion has been made that they could be profitably employed in the culture and picking of cotton, to the growth of which plant the valley is especially adapted.

PIMA COUNTY.

THIS favored section of Arizona is bounded on the east by Cochise County, on the north by Pinal and Maricopa Counties, on the west by Yuma County, and on the south by Mexico, its southern line being the international boundary, as established by the Commission.

That great artery of commerce, the Southern Pacific Railroad, passes through the northeastern portion of the County, and it may not be out of place to add here that the route selected by the railroad, on account of its feasibility from an economic and convenient standpoint, passes through the most desert-like and barren-appearing portion of the County. It is no exaggeration to say that, had the object of the railroad been to select the desert belt of the County, the eminent fitness of its choice would be apparent to all acquainted with the topography of Pima County and its great resources. It would be severely taxing the credulity of the traveler, who takes in the general landscape from a palace car window as he rushes along through this desert waste at the rate of forty miles an hour, to ask him to believe that this same County he may be condemning from the car window contains some of the most picturesque landscape scenery, some of the most productive farming and fruit lands, and some of the richest mineral lands to be found in any of the Western States and Territories. The valleys along its river courses lack but the magic hand of the cultivator to blossom and rival in appearance the valleys of the Mohawk, the Genesee, the Miami, or the Alleghany and other equally favored localities in the great basins of New York, Ohio and Pennsylvania, while in actual productiveness the soil of Pima County, aided by the climatic advantages of this semi-tropical section, would far surpass the possibilities of its Eastern rivals; but, through the facilities of the rapid transit of these modern times, the stranger is whirled along in ignorance of the manifold advantages of Pima County.

To reach the southeastern portion of Pima County by rail it is necessary to leave the Southern Pacific road at Benson, in Cochise County, and take the New Mexico and Arizona Railroad, which crosses into Pima County at a point in a direct line twenty-five miles south of the Southern Pacific Railroad. The land over which the New Mexico and Arizona Railroad passes into Pima County is exceedingly beautiful and adapted to agricultural and grazing purposes, the vast extent of the grazing ranges highly recommending it to stock-raisers. The soil, when artificially irrigated, is capable of raising rich crops of cereals,

or semi-tropical fruits, and with intelligent management, can be made very profitable. At present the land is utilized for grazing and farming purposes. Passing along to the west the railroad crosses through a magnificent section of country, where Nature's handiwork is displayed to great advantage. At old Camp Crittenden, which the railroad passes through, is one of the loveliest portions of Arizona, the soil possessing vast capabilities, while the natural scenery is exquisite. A feature of this neighborhood is the prolific yield of all orchard fruits, which excel both in quality, and in size, any of the California fruits that reach the markets of Arizona. Instead of the usually pinky apple of the artificially irrigated sections of Southern California, you find here the same excellent, juicy apples of the East; and what may be said in favor of the apple, is equally applicable to the pears, peaches and apricots that are raised here. They all excel, and speak much for an altitude of 3500 feet and upwards, for the successful cultivation of fruit in Southern Arizona, as the fruit trees near Camp Crittenden are over 4000 feet above sea level.

Near Camp Crittenden is a practically inexhaustible supply of a very superior hydraulic lime, extensively used throughout Southern Arizona. The Pennsylvania Ranch Company own extensive landed interests in this vicinity, and raise both cattle and horses successfully.

Slightly northeast from Camp Crittenden and about thirteen miles distant is the Empire ranch, one of the most valuable ranch properties in the Territory. The entire country hereabouts is well watered and covered with nutritious grasses, whereupon are grazed thousands of fine cattle.

West from the Empire ranch, and about twelve miles distant, is located the mining town of Greaterville, with about 150 inhabitants. Greaterville is situated on the eastern slope of the Santa Rita mountains, 6000 feet above sea level. The Santa Rita mountains tower above, 4000 feet higher, and are covered with oak and pine timber. The principal industry supporting the camp is the gold placer mining in its vicinity, which has been found profitable for fifteen years, though conducted in a very crude way. With the exception of the dry season the little gulches have sufficient water to admit of placer washing in a limited way by pans and rockers. Many very large nuggets have been taken out at Greaterville, and when money has been intelligently used to work these placers on a large scale, very profitable results may be expected. Gold in quartz also abounds, and the camp will grow and increase its production as prospecting advances and proper appliances are placed on the ground. Like Crittenden, this section of the County is well adapted to fruit, and throughout Southern Arizona it has become an established fact that the low lands are not the best adapted to fruit cultivation.

Northwest from Greaterville, about twenty miles, and north from the Empire ranch a distance of about ten miles, is located the Empire Mining District, in the Santa Rita mountains. The Total Wreck mine is located here. This mine has produced about \$400,000 in silver, and has been extensively worked. The workings are 600 feet deep in some places, and new discoveries of the marvelously rich ore peculiar to the mine have been reported. A very fine mill is located at the mine, and every facility in the way of water, wood, etc., seems to be available for the profitable working and development of the property. In the same District are many promising mines that have produced rich ore, and which will unquestionably become large producers with development. The ore contains both carbonates, and galena, and horn silver rock going thousands per ton in assays has been from the Total Wreck mine. The country surrounding the Empire Mining District is rich in nutritious grasses, and adapted to raising and fattening cattle, while the entire stretch of country from the foothills west to Tucson, a distance of twenty-five miles, can be utilized for stock or fruit purposes by a system of driven wells.

Camp Crittenden is at the head of the Senoita Canon, which runs in a southwestern direction, spreading out into a wide valley at Crittenden, but further south becoming narrower, until it merges into the Santa Cruz Valley at Calabasas. In the Senoita are found warm springs containing mineral properties. The formation is calcite. The New Mexico and Arizona railroad is built through this canon, and on account of the floods at certain seasons of the year, great trouble is experienced in maintaining the roadbed, and large and very expensive washouts are of almost yearly occurrence, delaying traffic and causing embarrassing passenger delays to and from Mexico and points in Arizona. It is generally conceded that the railroad selected a poor pathway for its roadbed when it determined on utilizing the Senoita Canon.

The town of Crittenden is located on the railroad, about seven miles south of Camp Crittenden and about fifty miles south of Benson, the northern terminus of the railroad, or thirty-five miles directly south of the Southern Pacific railroad. This prosperous little town of 200 inhabitants is the shipping point of the surrounding rich country and is the nearest railroad town to Harshaw, Washington and Salero mining camps and the mining camps and large ranches in the Patagonia Mountains. The altitude of Crittenden is over 4000 feet. The climate is delightful both winter and summer. A considerable amount of farming is done in the neighborhood of Crittenden, and there is also a smelter of forty tons capacity. About 1300 acres of land near Crittenden is under fence and about 800 in cultivation. All through this charming portion of the County are pre-emptions and homesteads, on which small orchards are seen thriving beyond the ordinary, and cereals attest the richness of the soil under a thrifty hand.

Harshaw is situated about fifteen miles east of the railroad and has a population of about 200 and an altitude of 5800 feet. The Hermosa mine, which has produced a veritable mint of money—something over a million dollars—is still actively worked, and its Huntington mill is kept constantly running on the ore produced from the mine. Forty men are employed in the mine and the mill, and development work is being intelligently pushed with energy. The mine has been opened to a depth of 800 feet. From March 20, 1889, to March 20, 1890, 6000 tons of ore was worked that produced 121,896 ounces of fine silver, of a net value in San Francisco of \$111,196, which equals 91 2-10 cents per ounce. The average of the ore put through the battery was 24 47-100 ounces per ton, worked up to 85 per cent in a Huntington mill of twenty tons capacity per day.

The expenses of this year's run are given as follows:

Paid out in wages.....	\$38,175
Paid for wood.....	4,044
Paid for hauling.....	6,500
Paid for mill supplies.....	3,000
Paid for mine supplies.....	3,000
Paid for quicksilver.....	3,286
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Total expenses.....	\$58,005
The gross product for year.....	\$111,196
Less expense.....	58,005
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Leaving net product.....	\$ 53,191

It will be borne in mind that this result is reached on ore averaging only 24 47-100 ounces to the ton. This statement shows what can be accomplished by economical and intelligent mining. There are throughout Pima County scores of mines lying idle and neglected that can be as economically worked as the Hermosa and whose ore yields a much higher value. It is said that there are mines in Harshaw, whose ore is the same as the Hermosa, and which, with the same facilities of a Huntington or other suitable mill, could be put on a solid paying basis within sixty days. It ought to be highly encouraging to the mining men of the county that 24-ounce silver ore can be made to pay 50 per cent profit when properly handled.

One of the most promising properties in Harshaw is the Hardshell mine, which has been extensively opened up with satisfactory results. Some of its ore is now being milled at Harshaw. Much of the Hardshell ore has gone very high in silver. The Alta mine has a shaft 100 feet deep and has produced a high-grade ore.

Going south on the road from Harshaw to Washington Camp we come to the Old Mowry and many other properties of great promise. The Mowry mine is located 6100 feet above sea level and lies on the eastern slope of the Patagonia Mountains. At the time of the Civil War and prior thereto, this mine was extensively worked by Lieutenant Mowry. At that period everything employed in the working of a mine was so extravagantly high as to almost preclude working any silver ore that did not average an extraordinary value. Still the production of this mine justified extensive development, and long continued work, and that, too, at a time when the hostile Indians were more disastrous to mining than the high prices that prevailed. Work on the Mowry was finally abandoned on account of the unpropitious state of affairs that reigned supreme, and the old workings, from long neglect, are in very bad shape. The past history of the mine and the universal belief in its merits justifies the hope that the near future may see work on the old Mowry resumed. The Trench mine, two miles from the Mowry, is being worked, and it is generally understood, with very satisfactory results. With well directed work, this mineral belt will prove very remunerative. The Trench mine is on the road to the Mowry, and about two and one-half miles from Harshaw, and is a very promising property and much work has been done. The Maurice and Blue Nose are good claims, about two miles from Harshaw. The Golden Gate is four miles from Harshaw and three-quarters of a mile northeast of the old Mowry shaft. It has been worked for three years past and work is still pushed on the property. The Olive, two miles west of the Mowry, has been extensively worked and produces high-grade ore. The McNamee and Humboldt properties are northwest of the Trench, one mile and one-half mile distant respectively. Both mines have been well opened up and are being worked now. Considerable ore of good quality has been produced.

The Red Rock district is located eight miles east of Crittenden. The mines of this district have been considerably developed and work is being done at present.

Washington Camp is situated south of Harshaw and east from Nogales. The ore bodies have been found large, with every appearance of being permanent. Although the camp for a long time bore the reputation of being a silver and lead camp, development has proven the existence of large veins of and deposits of copper ore. Considerable activity in mining operations is visible in this camp, and shipments of smelting ores are being considerably made. Several of the properties in this camp have recently passed into the hands of enterprising Eastern capitalists who are energetically pushing the work of development, and the indications are that eventually Washington Camp will become one of Arizona's heaviest copper producers.

Further to the south are the Patagonia and Duquesne Mining Camps. The properties in these camps are large producers of lead and silver. The country surrounding Harshaw, Washington, Duquesne, and Patagonia Camps abounds in game of all descriptions, and the climate is perfect itself. The Patagonia mountains, while steep and abrupt, are well covered with a variety of good grasses. The southern slope of these mountains terminates in long, rolling mesas, or ridges, which form here the eastern edge of the Santa Cruz valley. In the southeastern corner of the County is some of the most desirable grazing and farming land in the Territory; the surroundings are beautiful, the scenery unsurpassed and the health-giving properties of the climate would recommend this section to the most critical. The Government has a customs house at La Noria.

To the northeast of Crittenden, located in the Santa Rita mountains, is the Salero Mining Camp, one of the oldest in the Territory, and one that promises great things for the future. The formation is porphyry. Concentration works have been erected for the reduction of ores which carry lead and silver. An Eastern company is actively engaged in mining here, and shipments of concentrates are being made to Tucson.

From Crittenden southwesterly the New Mexico and Arizona Railroad passes through the Sonoita valley, which widens out at places, and yields prolifically when farmed. The land on both sides of the road, extending back to the mountains in mesas is covered with good grasses for stock or sheep-raising purposes. Large herds of cattle are grazed on both sides of the Sonoita, and their excellent condition bespeaks much for the nutriment in the varieties of grasses that abound.

At Calabasas, where the New Mexico and Arizona Railroad intersects the Santa Cruz valley, the perspective is indeed beautiful and gives the visitor a glimpse of a country well suited to fill his utmost expectations of a farming and grazing section. It would be the *beau ideal* of a visitor direct from an Eastern State, where he had left the verdure of early spring time at home. To the northeast are the Santa Rita mountains, while stretching to the north, as far as the eye can command is the beautiful Santa Cruz valley, and in all other directions magnificent mountain scenery pleasing to the eye can be seen. The hotel at Calabasas is possessed of the modern improvements of a city hostelry; the building itself being of brick with pleasing architectural features. This hotel was built in anticipation of a large influx of health-seekers to Calabasas, and the hotel will be a strong incentive to settle up the country in this neighborhood when the general public becomes acquainted with the health-giving properties of the climate and the interesting features of the country adjacent to

Calabasas. Hunting can be actively pursued from this point by the sport-loving nimrod, while prospecting and mining are the important features of the country east, west, south and north of Calabasas.

Continuing on the New Mexico and Arizona Railroad southerly, a distance of ten miles, through some very desirable land, we arrive at Nogales, the second city in importance and population in Pima County. Nogales has a population of 2000, and is built on the international boundary line, and was originally called Line City. There is a Nogales in the United States which is pre-eminently a live American town, and there is Nogales south of the international line, in Mexico, whose characteristics are wholly Mexican—what El Paso and Paso del Norte are to Texas and Mexico, Nogales is to Arizona and Mexico. The street running along the division line separating the two countries is called "International street."

Nogales is the southern terminus of the New Mexico and Arizona Railroad and the northern terminus of the Sonora Railroad, running south to Guaymas, on the Gulf of California, so that Nogales has direct railroad facilities to a shipping port. This little city is about seven years old and is rapidly growing, and has a law-abiding, intelligent population. Its buildings are mostly built in a substantial attractive manner, and its hotels are as good as any to be found in the Territory. Both our government and the Mexican government have located here custom houses and warehouses for bonded goods, and both governments have Consulates. Both American and Mexican money are freely used as a circulating medium, the latter at a discount. The Nogales trade was unquestionably largely augmented by the action of the Tucson merchants in refusing to continue to receive Mexican money for goods purchased for Sonora. As a natural consequence the Mexicans went where their money was received in exchange for the goods they desired, and the trade drifted to a very large extent to Nogales, where the merchants adapted the prices of their merchandise to the discount on Mexican money, and were glad to receive that money in payment for goods sold. The mineral country tributary to Nogales is rich in the precious metals and will materially aid in building up the enterprising city of Southern Pima County, as will likewise the extensive cattle industries carried on within the radius of fifteen miles from the town. A large smelter is one of the features of Nogales, it having been erected about five years ago, a large outlay of money being invested in the undertaking.

Two good newspapers are published at Nogales, and the stores are highly creditable.

The climate of Nogales might be properly termed "par excellence." Built as the town is, in a little valley, high and dry and far removed

from all malarial influences, it can only be equalled by other similarly located spots in our matchless climate. The drainage is so thorough that even the water falling during the short rainy seasons of the summer and winter runs off as though in a mill-race. The soil is a sandy loam that rapidly dries, and never makes mud or dampness. In the most oppressive of July days a gentle breeze is always felt at Nogales, as though the mountainous sides of the valley were a natural air conduit, and in the shade the air is all that could be desired, the altitude being about 4000 feet. Invalids can sleep comfortably during the hottest days in summer without suffering personal inconvenience, while the nights are calculated to recuperate the sick or give the well that blessed boon of health—perfect sleep. All pulmonary diseases are greatly relieved where it is possible for climatic influences to benefit, and the climate of Nogales, as well as all other parts of Pima County, acts as a perfect panacea in inflammatory rheumatism contracted in the damp climates of the East. If the medical fraternities of the East could see the marvelous action of our climate on inflammatory rheumatism and general pulmonary troubles, Pima County would become a thickly populated County.

The principal exports to Mexico are general merchandise for domestic purposes and mining machinery and mill supplies, and the imports are ores, cattle and hides.

Noonville, or Noon's Camp, as it is more commonly called, is situated about twelve miles west of Nogales and within three or four miles of the Sonora line. About three years ago mineral was discovered by Captain Noon, and since then a number of claims have been taken up until a very active camp has been formed. The early part of this year a five-stamp mill was erected upon the St. Patrick mine, which has been running steadily since. There has been considerable development work done on several of the claims, and much ore has been shipped to and sold in Nogales, but the low prices of both silver and lead, and the heavy expense of hauling and shipping ore, together with the reduction charges, have kept the camp from coming to the front, as would have been the case had the facilities been greater. The recent improved price of silver and lead is bringing about a general revival of business in Noonville. The ores are principally galena sulphides and chlorides, and on the surface have assayed and paid well. Those best qualified to form an opinion on the subject say that the indications for large and permanent deposits of mineral are excellent. With the exception of the St. Patrick, however, no development work to a greater depth than sixty or seventy feet has been done.

Oro Blanco is located about fifteen miles in a westerly direction from Noonville, and is reached directly by a rough trail over a divide,

the waters on the west side of which empty into Sonora, while those on the east run into the Santa Cruz. In Bear Valley, through which the trail passes, are located some fine ranches, where the owners are improving the breed of their stock by the importation of thoroughbreds. To the south of the trail is located the deserted site of the old town of Oro Blanco. About three miles west of Bear Valley the trail passes the Montana mine, owned in Philadelphia, and within a few hundred yards are the Border, Arizona No. 2 and Arizona No. 3 group of mines. The Border has produced a large amount of rich ore. The Montana is at present lying idle. The Jenkins mill is running regularly on good ore, which is said to go \$20, and is free milling. The Kirkpatrick mines, on this ledge, have had considerable work done on them and show up favorably. Still further east are situated the mines of Sheltenbrant, DeNoon, the Austerlitz, Ostrich, Empire, Yellow Jacket, and many others. These latter are gold mines, and the Yellow Jacket, which has lately been sold to parties in New York, has been developed to a depth of over 200 feet, with drifts on the ledges east and west. A twenty-stamp mill is in process of erection on the mine. The Yellow Jacket is generally conceded to be valuable, and ought to become a heavy producer, ranking among the first in Pima County.

The town of Arivaca is a little hamlet, pleasantly located, and is supported by the mines in the neighborhood. Arivaca is seven miles north of Oro Blanco, and there is an excellent wagon road connecting the two places which passes through an attractive valley. The country on both sides is rolling and thickly covered with grass. Arivaca is quite an old town, and was the location of the reduction works of the "Cerro Colorow," or Heintzelman mine, in the days dating back to the war. Water, wood and other mining conveniences existed here which made it practicable to haul the ore from the mine, a distance of about eight miles, for reduction at Arivaca. The reduction works were very extensive, and the large product from the mine made the town of Arivaca a lively place at this early day, as was also the "hacienda" surrounding the mine itself, which lies slightly off the general wagon thoroughfare, between Arivaca and Tucson. At the present time the ruins of the old Heintzelman mine present the appearance of a deserted village that has in past ages been a stronghold against the marauding Apache; but recently the shafting of the mine has been retimbered, and some probability exists of work being resumed in the future on this famous pioneer property. From the Heintzelman mine north to the Santa Cruz Valley is the Saporí Canon. The soil in this canon is admirable, and there exists sufficient water for its successful cultivation. Arivaca is situated by running water, and the soil is deep and loamy, and farming is carried on to a large extent on the desirable land in the beautiful flat near by, where many hundreds of acres are at present under fence, located on never-failing water. A more desirable farming

country cannot be imagined than that lying adjacent to Arivaca and at present occupied for farming and stock-raising purposes. The rolling country north of the town at certain seasons of the year is capable of growing hay that would do justice to the mower, and the hills that back up this undulating country are capable of supporting large herds of livestock, which, under the favorable circumstances surrounding this favored region, would wax fat and be marketable.

Two miles from the town there is a fine ten-stamp mill, formerly owned by the Consolidated Arizona Company, which is now running regularly, partially on custom ore. To the west are the Baboquivari and Sierra Verde ranges of mountains. Towering high above the Baboquivari range is the bald head of Baboquivari Peak, which pierces the air to an altitude of 10,000 feet above sea level, and is the most prominent landmark of Southern Arizona. From the north boundary line of Pima County, and far into Pinal County, Baboquivari Peak is clearly discernable, and it is reliably stated that at favorable points the peak can be seen at a distance of over two hundred miles.

The Baboquivari range extends into Sonora. The Baboquivari Mining District is spoken of very highly in connection with its mineral probabilities. The Octopus and Hudson groups of mines are located in this district and are being extensively worked. The Octopus ore body is very large and the grade of ore good. A large concentrating mill is located conveniently near the mine for economical reduction of the ores into concentrates. The concentrates are brought to Tucson.

To the west of the Baboquivari range, the country opens out again into a wide valley running north and south, to the west of which are the Quijotoa mountains. In this valley are located many ranches, among others the extensive ranch of Maish & Driscoll. The grazing throughout this section is admirable, but the lack of running water makes it necessary in most instances to bore deep wells for it.

The Quijotoa Mining District has attracted much attention during the last five years on account of the very extensive development work that has occurred in the Peer, Peerless, Crocker, Locomotive and other mines located there. Some time after the discovery of the mines, the original discoverers sold to California parties, who, since their purchase have never ceased development work. A fine twenty-stamp mill was erected soon after the acquisition of the property, answering all purposes of reduction of ore. The ore bodies are large and the ore of a fair grade.

The Gunsight Mining Camp is located in the Gunsight mountains, west of the Quijotoa mountains, and distant from the nearest point on the Southern Pacific Railroad — Gila Bend — 68 miles and 135 miles from Tucson. A twenty-stamp, perfectly-equipped mill is conveniently

located for the reduction of ore. This property is being worked, and the report is that a very large force of men will soon be engaged in thoroughly developing it.

The Ajo copper mines are situated in a spur of the mountains of that name, and have long been reputed to be rich in copper ores. The locations are among the oldest in the Territory, and have been much written about. At present the mines are idle.

The international boundary west of Tecolote, an Indian village near the line, runs over a region of country where living water is scarce, and where but little has been developed in wells.

Returning to Calabasas and proceeding north down the valley of the Santa Cruz, which river has its origin in Old Mexico, and eventually empties into the Gila, a fine valley of rich agricultural land extends almost the entire distance from Calabasas to Tucson, a distance of about sixty-five miles. A feature of the Santa Cruz river is that it sinks from sight and is only forced into an ordinary surface stream where bedrock is near the surface. At favorable points along the river bed, water can be developed by merely cutting a canal into the soil, until a depth of a few feet has been attained, sufficient to produce the water required. A cut of a very few feet in depth will accomplish this object, and water can be run out on the surface of the ground within a reasonable distance, according to the natural fall of the valley and the grade given the canal or ditch. This project of redeeming the land by artificial irrigation is entirely feasible and is largely practiced throughout Arizona. Irrigating pumps, used so extensively in Colorado and other places, are being largely employed for artificial irrigation and are giving great satisfaction. In places where the lift is not greater than twenty-seven feet, atmospheric pressure pumps are used, and this system of irrigation is economical and highly satisfactory. Where new land has been taken up for redemption, fuel, as a rule, abounds, and mesquit wood predominates. This latter wood is best adapted for the production of steam, of any wood in the West, without exception, and makes pumping an easy proposition. One pump is now employed in the Santa Cruz Valley that raises 2000 gallons of water per minute, and the place watered by this splendid stream is one of the most prolific producers in the Territory.

On the west side of the river, just before we reach the old town of Tubac, is the old mission church of Tumacacori. The mission at present is in an advanced state of decay, and serves only to resuscitate a memory of the past of this favored locality. Evidences of past civilization and the cultivation of land still exist here, in the ruins of gardens and houses. Near by the ruins of this ancient mission church—the handiwork of the Jesuits—are the remains of arrastras and smelters and

slag, and other evidence to show that the Jesuits at this point gave attention to temporal as well as spiritual matters. History tells us that the first church building was constructed in 1752, was reconstructed or added to in 1802, and was destroyed by the Apaches in 1820. Inasmuch as the building is of brick and fine cement, well calculated to withstand the ravages of time, its present state of ruin would indicate a still greater age. Many visitors find much interest about these romantic ruins. The mineral on all sides has been the means of centering near this point a large population during the past century, who were reasonably prosperous, even with their crude way of extracting the precious metals from the often rebellious ores, and it must be borne in mind that this work was pursued when extraordinary precautions had to be taken against the murderous Apache. With modern appliances, railroad facilities for cheap supplies, and no fear of incursions from hostile Indians, a most promising field exists here for enterprising miners and wide-awake business men.

Proceeding north a couple of miles down the Santa Cruz, we come to the old adobe town of Tubac. This town was for a long time the principal town of Arizona. In 1850 it was garrisoned with Mexican troops, and for a long time after Arizona was acquired from Mexico, it was the center of all mining operations in the south of the large companies operating in the Salero District, the Cerro Colorado country, Arivaca, the Santa Ritas, and other active camps, having their headquarters at Tubac. Tubac was a presidio when the country belonged to Mexico. Its desirability is very apparent when we reflect that it lies on the river, with an abundance of fine running water, surrounded by excellent agricultural country, and the centre of a mining region not unknown to even the monarchs of Spain, who had derived wealth therefrom. At Tubac was also located the Mission of St. Gertrude, established about 1750. The town is in a dilapidated condition now and presents very little of the activity it is known to have possessed for more than two centuries prior to 1860. All the natural advantages it ever possessed it possesses to-day, and its advantages over those days of its prosperity are too marked to dwell at length upon, as it was the very hotbed of Apache deviltry up to 1865, and men worked at their peril and plowed their fields, with their rifles strapped to their backs. When mining becomes active in Southern Arizona, this old town must be the centre of a considerable population. In the early days all the travel into what is now termed Arizona was along the old road through Tubac, the travelers debarking at some point on the Gulf of California and proceeding north along this route. The most magnificent mountain scenery in Pima County lies to the east of the town of Tubac, Mount Wrightson, or "Old Baldy," rising in majesty to an altitude of over 10,000 feet. Large game is common in this part of the Santa Ritas. Proceeding north from Tubac, down the Santa

Cruz. we find the same wide valley of incomparable soil, capable of yielding two prolific crops per annum. The grazing throughout is good.

Lying in the hills to the west of the Santa Cruz, nearly opposite the Conva ranch and about twenty-two miles south of Tucson, is the San Xavier Mining District, Olive Camp being its business centre. At the present time Olive Camp is the largest mining camp in Pima County. The formation of the district is an iron-stained, soft porphyry carrying silver and galena, and the veins dip at an angle of about 45 degrees, with one or two exceptions. The Speculative group of mines, recently sold to Eastern parties, is a vertical vein. The vein is exposed for a distance of 3000 feet. This company has three parallel veins that will average from three inches to three feet in width. The veins are considered very valuable, and are being extensively developed in a business-like way. The Richmore mine has also a vertical vein. A large amount of money has been extracted from this mine by chloriders. The Olive and Annie mines first brought the camp into prominence. The Olive, up to date, has produced over \$250,000. The Annie adjoins the Olive mine on the west and has produced a large amount of silver. Recently a very rich strike has been made in this mine, the ore going into the thousands in some places. The ore is a heavy antimonial sulphuret of lead and carries grey copper. On the east of the Olive the ledge has been found, after being prospected for a long while, and the fortunate discoverers are now reaping a rich harvest, having extracted a large amount and having plenty of rich ore developed. Many properties in this camp have been chlorided and have yielded largely.

Experts who know Olive Camp intimately, predict a great future for it. It is as yet comparatively undeveloped. The mines had to pay from grass roots down, or they were allowed to remain idle, as the mines were opened up by poor men, without the aid of capitalists, which speaks volumes for the richness of the camp. A new discovery has been made on what is known as Helmet Peak. The vein here has been prospected for a long time, and the owners now have a silver ore averaging about \$250 per ton. The formation is lime, with quartzite foot-wall. The vein is irregular, the ore occurring in connected chambers. Development work will show a valuable property. The San Xavier mine is the oldest mine in all this section, and is owned by an Eastern company. The property is exceedingly valuable, the ore being rich in carbonates of lead. This ore is in irregularly connected chambers, in lime formation, and in places is over sixteen feet wide. Chloriding has been successfully prosecuted, and with an intelligent management and a small outlay in putting the mine in condition, the mine could be made to pay handsomely. The mineral belt is about six miles

square, and active prospecting is going on, each succeeding strike making the camp more active.

Proceeding from the canon down the Santa Cruz a few miles, one of the finest mesquite forests in Arizona or Sonora is encountered. The trees grow large, some being three to three and one-half feet in diameter, and are very high. The area covered by these woods is very large, and it is estimated that over 100,000 cords of four-foot wood can be cut from this forest. One of the peculiarities of the mesquite tree is that you can cut it so that but a short stump remains, and new branches will sprout from the stump, and in a few years the original tree is reproduced. This is an invariable rule, though you cut the tree down in the hottest day in summer, and during the dry season. The northern edge of these woods is within ten miles of the city of Tucson, and the vast quantity of wood used in Tucson for manufacturing and domestic purposes is mostly cut in what are known as the San Xavier woods. The value of this natural product, so near to Tucson, can hardly be over-estimated, and it is believed that the woods are extensive enough to reproduce by growth on stumps the amount annually consumed. The size attained by the mesquite tree is one of the best indications of the richness of the soil, and it is an invariable criterion of old settlers. To clear this rich land it would be necessary to destroy the stump. Water is near the surface, and this vast area of desirable land can be irrigated by pumps, or by canals taken out up the river, when the land is required for agricultural purposes.

SAN XAVIER DEL BAC.

One mile north of the woods, and nine miles south of Tucson, is located the old mission church of San Xavier del Bac. This relic of antiquity is, with the single exception of the Casa Grande, the most interesting spot in Arizona. Standing like a sentinel in the desert, with its walls, towers and white dome in a fair state of preservation, it is the mecca of the visitor and the marvel of all who see it. The interior is kept in condition for service, and much of its decoration is surpassingly fine, and indicates a high state of workmanship for the builders who could construct such a temple of worship in the midst of desert surroundings, and without the appliances ordinarily employed in the construction of such edifices. The material employed in the construction of this interesting production of a past century, consists of large flat bricks of a very superior quality, native woods, which abound near by, and an excellent quality of cement. It is to be regretted that the foundation of the church is utterly neglected, though in a precarious condition. From the same neglect much of the wall enclosing the space in front of the church, and the burying ground at its side, has fallen to the ground during the past five years, and unless active steps are soon taken to preserve the front wall of the church

itself, it is not unlikely that the church will be irreparably damaged by its fall, and the link that connects us with the old Jesuit padres be thus razed into an historical but complete ruin.

The best authority goes to show that the original Mission at San Xavier was constructed in 1690. Whether this original building formed any part of the present church is uncertain, but, inasmuch as not a vestige remains of any other church in this vicinity, it seems probable that the original building stood on this same site, or, perhaps, was enlarged into the building as it now appears. It is a generally accepted belief that the present building was commenced in 1768, and finished many years later; but a careful observer, considering the extraordinarily good building material used, in a climate calculated to preserve, rather than destroy, and its present evidences of age, would conclude that the church was even much older than the date given and generally accepted as being correct. The old map of the Jesuits, made in 1777, particularly marks the Mission of San Xavier del Bac, and it is a favorite theory of the student of Pimaria Alta that the Spanish founded a military post at what is now Tucson, in 1694, for the purpose of protecting the Mission of San Xavier. The Jesuit map of 1698, which evinces a wonderfully accurate knowledge of the geographical features of this section of Arizona, marks San Xavier del Bac at its proper locus. So there is no question that a mission has been in existence for 200 years at the place occupied by the present church.

The civilizing influence of this mission is observable in the Papago Indians, on whose reservation the church now stands, and whose great veneration for all its surroundings is equal to that of our most advanced Christians towards their favorite creeds. The Papagoes are a numerous tribe, and from the day that the influences emanating from the mission were first felt, they have been friendly to the whites and their protectors in many instances. They have been implacable in their hatred of the Apaches, and have time and again saved the San Xavier Mission from sharing, at the hands of the Apaches, a fate similar to that of Tumacacori.

Both to the north and south of the church building are extensive agricultural fields, where large crops are raised by the Indians and by farmers.

TUCSON.

Continuing north down the Santa Cruz we come to the city of Tucson, located on the Southern Pacific railroad. The date of the settlement of Tucson is rather unsettled, some historians claiming that it was first settled in 1560. However this may be, it is certainly of sufficient age to promise permanence. Although there were a few whites in Tucson prior to the Civil War, its start as an American town may

very properly be placed at the period when the California column took possession of the city. Following closely after, several firms of considerable importance brought goods here and traffic became lively and the old Mexican pueblo put on a new dressing and began to grow prosperous and enterprising. This prosperity has continued with small interruption to the present time.

The present population of the city proper is 5200. The mercantile establishments of Tucson would be a credit to any Eastern city of double its population, both in appearance of the stores and the vast amount of business transacted, whole towns being supplied from this point, and oftentimes through the purchasing agency of one person. A large amount of Tucson's merchandise goes into various towns in Sonora. Some manufacturing is done. There are two grist mills, one being equipped with the modern roller process, wagon factories, gas works, water works, ice works, a tannery and a smelter, a short distance west of town. There are fine church buildings, two daily newspapers, an \$80,000 court house and a \$50,000 public school house. Considerable building is being done, many of the new buildings being of frame and brick. Much attention is being paid to beautifying the city by adding foliage to the streets and lawns, and flower-gardens to the houses. The city is lighted by gas and the water service is excellent and the water of a good quality. Tucson has a volunteer fire department and well kept hotels, two public gardens and a public square and a fine library.

The Territorial University is located near Tucson, on a high tract of land overlooking the city. It is not yet in operation, but work is being prosecuted upon the first of the buildings, and the college may be expected to commence its career of usefulness at the beginning of the next scholastic year. The School of Mines will be the only branch in operation for the first year, owing to the limited resources of the institution. In conjunction with the University, is an experimental agricultural station, maintained by National appropriation. The station is under the charge of Professor F. A. Gulley, who has been installed as Professor of Agriculture.

The Santa Cruz is on the west side of the city and furnishes water for 2000 acres of land, cultivated in the immediate vicinity. The crops of cereals, alfalfa, sugar-cane and garden truck raised on this land are wonderful, considering a large portion of the land has been cultivated, certainly for upwards of a century, almost without the use of fertilizers. The alluvial deposit from the overflowing of the river at long intervals is nature's renovator of the soil. All garden vegetables in Tucson are remarkably cheap and of a superior quality.

The basin in which Tucson is located is surrounded by high ranges of mountains, liberally supplied with springs and running water, and it is reasonably certain that artesian water will be struck with a fair trial at Tucson.

Fruit culture has been but partially successful in the flat along the Santa Cruz river, owing to the liability to frosts at unpropitious times, but the experiment of raising fruits on the mesa lands is being successfully tried. Figs, pears, apricots, peaches, prunes, raisin and other grapes, and probably olives can be raised, while sixteen miles from Tucson oranges are successfully cultivated at the base of the mountains. The original theory of selecting the low lands for fruits was a grave mistake, but a very natural one. One orchard of 4000 trees lies three miles west of town, the trees being easily and thoroughly watered from wells by wind-mill power, with a steam pump ready in case of emergency. The growth of these trees is marvelous, and the courageous owner will reap a rich harvest from his labor and outlay. Alfalfa can be counted on to raise five tons to the acre, with four cuttings, and when properly cured makes a most nutritious and healthy hay, and while growing affords a good pasturage.

The Southern Pacific Railroad has built mammoth shops at Tucson, and own many attractive buildings. Its employees have a fine library.

Most of the United States officials of Arizona are located at Tucson.

The future importance of Tucson is positive. The keynote to its prosperity is a north and south railroad, connecting the great Atlantic and Pacific Railroad system in the north with the Gulf of California. This can be most successfully accomplished by building south from the Atlantic and Pacific railroad, through Prescott, Phoenix, Florence and Tucson and down the Santa Cruz Valley, to connect with the New Mexico and Arizona railroad at Calabasas.

The climate of Tucson is charming. For nine months in the year it is all that the heart could desire, while the remaining three months the heat is not so oppressive as in the great cities of New York or Chicago, and it is a fact, proven beyond controversy, that the three hot months are the healthiest of the year, and especially beneficial in lung and rheumatic diseases. The mountains surrounding Tucson afford a haven of rest, and cool climate if it is found desirable to leave Tucson during July, August and September.

A very large amount of fine land will be redeemed, a short distance north of Tucson, when the Santa Catalina Canal Company completes the work at present under construction. After experimenting to ascertain the volume of water passing eight feet under the sandy bottom of

the Rillito, it was found that water sufficient to irrigate 15,000 acres of land could be secured by a comparatively small outlay of money. The Santa Catalina Canal Company intend to bring sufficient water to the surface to irrigate 3000 to 4000 acres of land, and to that end a cement aqueduct has been constructed at the proper level, under the sand, to conduct the water gathered by an ingenious system of feeders, through the sandy soil to the open canal, where the soil is adapted to convey the water with little seepage. When the first work has been demonstrated a success, it is the intention of the company to construct a second series of canals of greater capacity than the first, and thus utilize, as far as possible, the available water. The completion of this undertaking must largely enhance values in Tucson.

Six miles to the east of Tucson is Fort Lowell, where a considerable body of soldiers is stationed. Lowell presents the appearance of an attractive village.

Beyond Lowell, a distance of about nine miles there are hot springs that have been found efficacious for both muscular and inflammatory rheumatism and other distressing diseases. A fine fruit orchard is a feature at these springs. A sanitarium could be successfully conducted here, but everything is in a crude state thus far.

Tucson is surrounded by a fine mineral country. The Mammoth mine, owned in England, a very large producer of gold, and other mines of the Mammoth camp, although located in Pinal County, are tributary to Tucson, all supplies being purchased in that city. The Old Hat District in the Catalina mountains, which has been considerably prospected, and somewhat developed, buys supplies in Tucson, as does the Southern Belle gold mine, which has produced a very large amount of gold. There are many other good properties in the Southern Belle camp. The Oracle country, which is rich in minerals, although located north of Pima County, is wholly supplied from Tucson.

The Silver Belle, about forty-five miles northwest of Tucson in Pima County, is a rich and lively camp and promises well for the future. Some very valuable properties in this camp have lately been sold to English capitalists, who are energetically pushing the development of their mines, erecting suitable buildings and in every way preparing for the extensive opening up of their properties. Much of the ore is lead carbonates carrying a fair amount of silver. The ore bodies are strong, with good promises of permanence. A feature of the lead carbonates seems to be that as the ore loses its high per centage of lead there is a marked increase in the silver. The copper properties of this camp show up well. The Old Boat mine is the best developed and shows large bodies of ore that could be stoped out from the start. The workings are extensive, but were poorly directed, and

the whole management of this property was extravagant in the extreme, and wholly inexperienced men had charge of the work at fabulous salaries at a time when prices and mining labor were at the highest ever reached in the Territory, With intelligent and economical work this property promises great things with copper rated where it is at present.

The Owl Heads Mining Camp in the Tortillitos mountains has been worked for a long period with good success, and is a constant shipper of silver bullion. The Jessie Benton and other very valuable mines are located in this camp. All supplies are purchased at Tucson. A good mill is located convenient to the mines. The camp is about thirty-five miles from Tucson. Considerable capital has been put in the purchasing and developing of the mines in this camp with good results.

The Amole Mining District is located ten miles southwest of Tucson, on the west side of the Tucson mountains. The formation is similar to that of the Olive Camp, and is very favorable. The ore carries gold, silver and galena. The principal mine in this district is the Saginaw, on which work has been vigorously and intelligently pushed with excellent results. The mine is opened up to a depth of 275 feet, and the showing in its bottom workings is the best that has been found in the mine. Concentration works will be erected for the Saginaw, when it will become a steady shipper. The Dakota mine, in this same district, is being actively developed and has a shaft sixty feet deep, which is all in good ore. The mine will be extensively opened up in the next few months and good results are promised. The ore is similar in character to the Saginaw.

In the Amole District there are some very good prospects that have received little attention, but which promise well for the future. The mining supplies for this district are purchased in Tucson, and before long will be a factor in Tucson's prosperity.

Throughout the Tucson mountains are some valuable prospects which will undoubtedly develop well and add much to the prosperity of the city.

A number of good copper prospects lie in the Santa Rita mountains from thirty to forty miles distant from Tucson. Among these may be enumerated the Omega and Columbia copper camps. No very extensive developing work has yet occurred, but the probability is that the present high price of copper will prove an incentive to work in these camps.

The several grazing sections around Tucson conduce largely to make it prosperous, and the nature of the business which supports this place, and the wide extent of territory contributing to its business, necessarily makes it permanent and bound to grow.

Within the County, and east of Tucson, is the railroad station of Pantano, maintained for the convenience of the ranches and mining camps back of the railroad at that point, and west of Tucson, within the County, on the line of the railroad, are a couple of stations for railroad convenience.

Pima County is rich in mineral wealth, the broad expanse of its grazing lands and its wonderful and exhilarating climate, and eventually the County will support a large population.

The County has a population of about 14,000. Its area is about 10,500 square miles. The total valuation of property is \$3,845,399.56. Among the items of the assessment roll are 176,097 acres of land, assessed at \$354,118; 5568 horses, at \$111,412, and 113,974 head of cattle, at \$885,280.

PINAL COUNTY.

THIS division lies to the north of Pima County and to the east and southeast of Maricopa. It was formed in 1875 from portions of Maricopa, Yavapai and Pima Counties. It subsequently surrendered a portion of its area to the new County of Gila, and now embraces but 5368 square miles, or 3,435,520 acres. Of this extent only 21,214 acres are assessed, at a valuation of \$161,383. The total valuation of property within the County is \$1,903,401.53. The population is about 5000.

Pinal County has ambitious hopes in an agricultural way. Through the entire length of the County flows the Gila river, and its flood will yet be drawn from for the irrigation of a million acres of the lands lying to the south of the stream, far off on the plain as far as the line of the Southern Pacific Railroad. The reason why so little has as yet been done is apparent. The Gila for a long distance in the western part of the County is monopolized by the Pima and Maricopa Indian reservation, while it issues from mountains and precipitious gorges only about twenty-five miles east of Florence. The bottom land, of course, was all that could be taken up and improved by the early farmers with their limited means. Now, through the application of capital, the future seems clear and Pinal will soon assume a place as one of Pomona's most beautiful gardens. What has already been said of the capabilities of Maricopa and Yuma Counties for agriculture can truthfully be also applied to Pinal County. The lands near the streams are rich and

heavy, while on the plains beyond the grape and the orange and fig would find congenial homes. The results of agricultural investigations thus far are expressed in the following excerpt from a report issued by a special committee of citizens, relative to the arid lands of the County:

"But very few years have elapsed since the industry of the farmer in this valley was solely directed towards the production of the few simple requisites of home consumption, and if the horticultural possibilities of the valley were thought of at all, they intruded only as pleasant dreams.

"Beyond the production of hay and cereals, little advance was made until a few years ago, when experiments in fruit culture were undertaken in a modest way and with varied results.

"Sufficient is now known to form the basis of intelligent calculation of the desirability and value of many species in cultivation, for the guidance of those about to cultivate land.

"The grape is especially adapted to this soil and climate, where it reaches almost perfection in quality and abundance in quantity. Unusual saccharine qualities are developed, which especially adapt them to table use and in raisin making. Nearly every variety of grape so far tested grows luxuriantly in this valley, and it is clearly evident that raisin culture is destined to become a prominent industry. Two crops of grapes often grow in a single season, and ripe grapes have been picked from the vines in the open air, but in very limited quantities, in January, but such a circumstance is rare.

"The fig thrives remarkably well, bears heavily, withstands neglect, and is a source of great profit to growers. From two to three crops per year are gathered. It bears the second season from the cuttings. The apricot, peach, nectarine, plum, prune, pear, early apple, quince, mulberry, date, pomegranate, cherry, and all the small fruits and berries, are grown, while almonds, walnuts and pecans thrive exceptionally well.

"Culture of the citrus fruits has been undertaken only recently, and at this time it promises to prove a success. Several orange orchards will be planted the coming winter, and it is believed that a little care taken during the first season will insure their successful growth. The absence of all fogs and nightly dews is a formidable obstacle to the existence of the destructive and unsightly scale-bug, and the fruits of the valley are all bright and clean. The season is somewhat in advance of that of Southern California, which gives fruit growers an appreciated advantage in the early markets. All the agricultural products of the temperate zone are easily grown here, the long seasons giving a succession of crops that double or treble the productive value of the land.

"Wheat and barley are largely produced, although they are amongst the least profitable crops under the irrigating system. A careful estimate of the cost of carrying through to a marketable condition a field of wheat or barley, including rent on the value of the land, gives \$13 per acre as the average. Wheat yields about 1500 pounds per acre, and, therefore, costs 85 cents per cental, and barley yields about 1800 pounds per acre and costs 75 cents per cental, leaving a very small margin of profit. During the season of 1889 the valley produced fully 6,000,000 pounds of grain.

"Alfalfa is the most productive and profitable forage plant in the valley, and produces, under different conditions, from one to three tons of hay per acre at each cutting, and from three to five cuttings per year. After a field of alfalfa is once well established, the cost of hay in the stack will be about \$2.50 per acre. In exceptional instances, as high as four tons of alfalfa hay per acre have been cut, and five or six cuttings made in a single season, but this is more than double the average. The hay crop of the past season aggregates, approximately, 1000 tons.

"The home market afforded by the adjacent mining camps has consumed the surplus products of the valley in past years, but the constantly increasing acreage coming into cultivation will encourage the exportation of the large fruit production that will eventually form the principal industry of the valley."

On the Gila until lately were only a few small co-operative canals, covering but 8440 acres, about half of which area has been cultivated to grain and alfalfa. Within the last year has been added the Florence canal with a present capacity of about 20,000 miners' inches, a length of forty-three miles and covering an area of 60,000 acres. This last, the only considerable irrigation enterprise in the County, has its head at a rocky point on the Gila, about fifteen miles east of Florence, where the company designs before long to construct a large rock dam for the storage of the waters of the Gila, which are often elusive during the summer season. The canal course runs a few miles south of Florence and cuts the Southern Pacific railroad near the station of Casa Grande. Nearly all the lands between Florence and Casa Grande are of excellent quality. A storage reservoir has been constructed on the canal in a natural basin fifteen miles south of Florence, as an aid to irrigation during the dry summer months. It has a capacity of 8,000,000,000 gallons, and the necessary embankments have been thrown up at a cost of nearly \$100,000. There are now about 6000 acres cultivated under this canal.

The people of Pinal County have asked that Governmental assistance be granted to impound the winter waters of the Gila. The site surveyed at the Buttes is an excellent one, and a dam 150 feet high

would store more than enough water to irrigate all the available land in the County, estimated at over 500,000 acres.

At the mouth of Queen Creek Canon, about twenty miles north of Florence, is also an excellent site for a storage dam, the canon being narrow and the watershed large. A reservoir at this point would serve to irrigate many thousands of level and fertile acres, sloping gently away from the Superstition and Sacaton mountains.

The average rainfall at Florence is about ten inches, and the atmospheric conditions and temperature much the same as noted at Phoenix.

Mention must not be omitted of the valley of the San Pedro. This stream, in its northward course, enters the County at its southeastern corner and flows into the Gila. Along its course in the County are some sixteen small ditches, sufficient to the irrigating of 3000 acres of good farming land. The products of this valley find ready and profitable sale in the mining districts to the northward.

The faith of the people of Pinal in their County is boundless, and can be best expressed by the following, a clipping from the local newspaper of Florence :

"The entries of land under the Florence canal now aggregate very nearly ninety thousand acres, of which fully 98 per cent can be covered with water. About six thousand acres are under cultivation, and preparations are being made to prepare from ten to fifteen thousand acres the coming fall and winter. Of the acreage entered, it is safe to estimate that 75 per cent will be cleared and tilled within the next two years and largely planted to fruits. The land is the most fertile of any portion of Arizona, is free from alkali, and is especially adapted to the cultivation of fruits of all kinds, as well as the usual farm products of the temperate zone, including many semi-tropical productions. With such resources at our doors, there is every reason for our expressed faith in the immediate growth of Florence into a city of large size and importance. But beyond our substantial agricultural interests, there are other resources that must largely contribute to our prosperity. From the Silver King to the Gila river, at the Buttes, and extending along the stream to Riverside and above, is one of the largest and richest mineral belts of the Pacific Coast ; and when the huge dam at the Buttes is constructed, its prodigious water power will be utilized for the reduction of the adjacent ores, and a large mining and manufacturing town will be built within sight of Florence that will give the best possible market for the larger portion of the products of the valley. Such a concentration of wonderful and permanent resources cannot fail to invite the attention of capitalists, and but one result is possible to conceive—plenty and prosperity. With a full realization

of the value of our great resources, our people should organize for the purpose of inducing men of means, enterprise and intelligence to establish themselves in our midst, and to foster every possible industry that promises success."

Florence, the County seat, is 1553 feet above sea level. It is a town of about 1500 inhabitants, situated near the Gila river, twenty-six miles northeast of the railroad station of Casa Grande, with which it is connected by a daily stage. It has many handsome private residences, several brick stores, and the usual accessories of a frontier town. It has an excellent graded school employing five teachers, churches, several secret societies, a bank, and an excellent weekly newspaper, the *Enterprise*. A handsome new court house, to cost \$30,000, will shortly be erected. Streams of water flow along either side of the streets, and numerous shade trees impart an air of comfort upon even the warmest days. Florence is well situated for commerce, at the only point where the Gila is spanned by a bridge. Roads radiate to Phoenix, to Pinal, to Globe and to the stations on the railroad. While its prosperity is, of course, largely dependent upon the activity of the mining camps of Pinal and Gila Counties, its inhabitants are permanent and its industries fixed. With the irrigation of the mesa lands to the south, a steady increase is to be looked for in its population.

Twenty-eight miles to the north is the town of Pinal, in the stormy days of Apache warfare called Picket Post. This camp, located in a gap between the Superstition and Pinal mountains, for many years was one of the liveliest in the Territory. The twenty-stamp mill of the Silver King mine was located here, and prospecting in the mountains around was continuous and development upon every claim active. The mill is now silent, the miners have gone to newer fields and the camp is under somewhat of an eclipse. A few miners, secure in the possession of bonanzas, still hammer away, and it is to be hoped that their perseverance will lead others to return and resume work upon many mines, which under proper management would return rich dividends.

Silver King is located up a steep mountain road, five miles distant from Pinal. Here the extensive hoisting works of the Silver King is the most prominent feature of the landscape. This mine, which has produced several millions of dollars in its time, is now lying idle, though there are rumors of a fresh start being made and a determined hunt for more of the precious white metal in the lower levels. The mine is celebrated in the history of Arizona. Prospectors had passed a tall pillar of black "lead" repeatedly, and it was not until 1875 that the mass of metal exposed was found to be almost pure silver. The ore in development was found to lie in a "chimney," almost vertical, and was of a richness doubtless never exceeded in any

considerable body ever worked elsewhere. The pay ore failed at the 800-foot level, and the chimney was cleared of what remained of the precious mineral and abandoned. It is highly probable, however, that exploration will disclose more "chambers" of the ore, and that the mine will yet regain much of its old-time fame.

There are a cluster of well-developed claims around the King, though the King ore body has never been struck outside the original location. Silver King is now important chiefly by its position at the entrance to the short trail to Globe, over which are packed most of the copper camp's supplies.

About twelve miles southeast of Pinal is the flourishing Reymert Camp. Here is located the smelter of the DeNoon mines, a group that are producing silver ore in a manner that must be gratifying in the extreme to the owners.

The spurs of the Pinal mountains, which under different names fill the northeastern portion of the County, are rich with precious metals, particularly in silver ores carrying a large percentage of lead.

At the extreme eastern edge of the County, within the White Mountain Reservation, lie the Lower Deer Creek coal fields, the body of mineral extending over to a considerable distance into Graham County. Efforts are being made to have this portion of the reservation thrown open for location, as it is useless to the Indians while containing treasure that gives to its hills the greatest value in the eyes of the progressive whites. Not only is there coal, but there are excellent prospects of copper, lead and silver. The Tucson and Globe Railroad was intended to tap these coal beds, and if the reservation should be so abridged as to leave the beds outside its line, the Southern Pacific would find it profitable to run a branch to the mines. The opening of the coal fields would be of the greatest benefit to Globe. The coal cokes very well, and the coke could be delivered to the smelters of the copper camp at a much lower price than they now pay for coke transported from Colorado and Pennsylvania.

In the foothills of the Santa Catalina range of mountains, on the San Pedro river, in the southeastern portion of Pinal County, is the thriving settlement of Mammoth. The camp has a population of about 500, nearly all dependent upon the Mammoth group of mines for a livelihood. The mill of the company constitutes the chief industry of the town. The mill, one of fifty stamps, has been running profitably, night and day, for the past six months, consuming about 100 tons of ore per diem. The probability is that the mill will be doubled in size before many months, as there is enough ore in sight in the mine to run even such a great plant with success for five years. The mine is located in what is known as the Black Hills, three miles back from the river

and at an elevation of 800 feet above the stream. The ore body is very large and has been opened up for 700 feet along the ledge to a depth of over 500 feet. It is to be remarked that the mine is perfectly dry in all portions. The ore is gold, usually found in a red oxide of iron, though lead is encountered in some portions of the property.

Bunker Hill District is a promising mining section on the north side of the San Pedro in the Galluria range. Much chloriding is being done. The Table Mountain and other copper properties in this neighborhood are attracting much attention.

Up the river from Florence, the country is highly mineralized, silver, gold, lead and copper being found in many forms and in great abundance. Only a few mines are working, the majority lying dormant till awakened by the touch of capital.

Active work is being prosecuted on a number of mines in the Owl Heads District, north of Red Rock Station, on the Southern Pacific.

One of the very best mining districts in the County, in point of production, is that to the south of Casa Grande station. The principal mine is the Vekol, a vast deposit of ore, in chambers rather than in ledge formations. It was long worked by means of Indian labor, in a very crude manner, but lately a mill and hoisting works have been erected and the output of bullion under skilled management has been largely increased.

The Copperosity mine lies between the Vekol and the railroad. It displays a fine grade of high-grade copper ore, as do a number of other prospects in the neighborhood. All of the desert hills in this neighborhood are rich in mineral.

Casa Grande and the adjoining districts are supplied from Casa Grande station, where a thriving town has sprung up, sustained by its forwarding business to points in Gila and Pinal Counties and by the mining trade. Should the Florence canal prove a success, agriculture will add a material support to the ambitious little town. It now claims a population of about 500.

Maricopa station, on the Southern Pacific, is one of the termini of the Maricopa and Phoenix Railroad. It has a small population, sustained entirely by the railroad freight and passenger traffic. The Maricopa and Phoenix is a broad-gauge and well-equipped road, comparing favorably with any of the short lines of the West. It has aided materially in developing the rich agricultural country that lies thirty miles to the northward. Near Maricopa an attempt is being made to establish a raisin vineyard of large extent, water for irrigation being furnished by means of a well and steam pumps.

The settlement of Riverside, on the Gila river, about forty miles east of Florence, is now little more than a stage station on the round-about road upon which freight is hauled to Globe. It is in the midst of a good mining country, the development of which may soon cause Riverside to materialize into a town of some prominence.

There is a rumor that a new townsite is to be laid off on the Southern Pacific railroad, near the line of the Florence Canal, a few miles east of Casa Grande. A station at that point would shorten the distance to Florence materially, and would be situated upon a body of land not surpassed in quality by any in Arizona.

The ruins of Casa Grande are passed on the stage road between the station of that name and Florence, about six miles south of the latter place. The details of this great relic of prehistoric civilization have been so often given that a repetition would be uninteresting and useless. Though in the Salt River Valley are to be found more extensive remains of the dwellings of the Toltec era, this is the best preserved of all the ancient buildings of the lower valleys. It would seem as though the white man's civilization were having a most damaging effect upon the structure, for the walls are crumbling, the interior partitions are nearly gone and the time is rapidly approaching when the old castle will be in no respects dissimilar to the many other great mounds that lie scattered about the plains, once fertile under the cultivation of a departed race. An appropriation was recently made by Congress toward the preservation of Casa Grande and a governmental agent has been upon the ground on a visit of inspection. He recommends, it is understood, the inclosing of the building within a larger structure of brick. Such a method would, no doubt, be effective in preserving the old walls, but would be, to say the least, incongruous.

The southwestern portion of the County, along the Gila river is occupied by the Pima and Maricopa Indian reservation. It embraces much fertile land, a large amount of which is tilled by these peaceable and industrious tribes. They raise annually several million pounds of Sonora wheat, a plump spring wheat, which seems especially adapted to the climate, and which returns a surprising yield. With wheat, corn, pumpkins, mesquite beans and the small game of the lowlands, the Indians provide for themselves bounteously and are usually plump and apparently well satisfied with themselves and the world. Their agency is at Sacaton, west of Florence, on the Gila, where extensive buildings have been erected by the Government for schools and offices. The police regulations of the reservation are entirely under the charge of a corps of Indians, who are exceptionally faithful in the discharge of their duties, and diligent in arresting all wrong-doers.

GRAHAM COUNTY.

THIS county is located on the eastern border of the Territory, east of Pinal and north of Cochise County. The author is pleased to draw upon the information contained in a carefully compiled report presented to the Board of Supervisors of the County by Henry Rupkey, Esq.

Graham County was organized in 1881, and contained then about 3000 inhabitants. At the first County election 704 votes were cast, and the taxable property at that time was valued at \$318,176. From that time on, until within the last few years, the progress of the County has been materially retarded by the insecurity of life and property, occasioned by Indian outbreaks. But, in spite of this drawback, which, however, now is happily a thing of the past, the population of the County has been doubled and the value of taxable property had increased last year to \$1,500,000. This year the tax roll foots up property amounting to \$1,548,740.

The climatic and sanitary conditions are best exhibited by the following two tables:

I. Sanitary and Climatic Statistics for 1889, by Dr. Johnson at Thomas and Dr. Bannister at Grant.

PLACE.	MEAN ANNUAL TEMP.	LOWEST TEMP.	HIGHEST TEMP.	ANNUAL RAIN- FALL.	ENDEMIC DISEASES.	DEATH RATE.	EPIDEMIC	DEATH RATE.
Thomas	64.8	15	108.7	10.89	0	0	None	0
Grant	61.6	19	98	13.32	0	0	Grippe	0

II. Rainfall at Thomas during different months of 1889.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1.47	1.35	.96	.10	.00	trace	3.45	1.40	.38	.26	.35	1.18

It will be seen from table No. 1 that the summers are hot (although the nights are generally cool enough to be comfortable); that the winters are mild; that the rainfall is not inconsiderable, and that the general health is excellent. With the exception of la grippe last winter, which seemed to be the common lot of every country, no epidemics are known in the County. Fogs are entirely unknown, and

the want of moisture in the atmosphere, combined with the high elevation above the level of the sea, make the County especially adapted to the cure of pulmonary diseases.

Table No. 2 shows that the heaviest rainfall occurs during the months when it is needed most; during the months of July and August, when, by reason of the great heat, the evaporation of moisture from the soil is very rapid, a large quantity of rain falls; the next heaviest precipitation is during December, January and February, at which time it enables the farmer to sow his small grain and get it to germinate without previous irrigation of the land. The very slight rainfall of April, May and June does not occasion much inconvenience, as during these months all the streams and valleys are abundantly supplied with water from the melting snow in the mountains.

The schools of the County have steadily improved and their number has been increased, as will be seen from Table No. 3, kindly furnished by the County Superintendent of Schools, Judge John Blake:

III. School Statistics of Graham County.

No. of schools in County when first organized (1881).....	4
No. of schools in County now (1890).....	18
No. of census children in 1881.....	283
No. of census children in 1889.....	1,519
Total No. of attendance at schools in 1889.....	662
Total amount expended for school purposes in 1889.....	\$12,055
Average salary paid to teachers per month.....	\$ 76
Present value of school property in County.....	\$ 9,488

Churches did not exist in Graham County at the time of its organization. Since then, a fine Catholic church has been built at Solomonville, and others are now building in Thomas and Clifton. Religious services are also conducted at Clifton by a Protestant minister.

The roads of the County compare favorably with those of other newly-settled countries; the expenditures on them amounted last year to \$2000. As yet there are of railroads in the County only forty miles, the Arizona and New Mexico Railway, constructed by the Arizona Copper Company, of Clifton. Bowie Station and Wilcox are situated close to the southern border of the County, and freight rates from these stations to all parts of the County are not high, only 70 cents per cwt. being paid to one of the furthest points, namely Thomas. The Government only pays 42 cents per cwt. to the same point by contract. Good stage coaches run on the different County roads, and daily mails are in order in most of the towns and villages.

Benevolent institutions have not as yet been established, if we except a good County Hospital at Solomonville. Nor are they needed.

so far, the people of the County being healthy in mind and body, willing to work, and finding plenty of work to do at remunerative prices. This is proved by the fact that at present only four persons (including paupers, idiots, maimed and crippled) have to be supported by the County.

The criminal records of the County show that an average of ten persons only have been convicted annually in the District Court. This shows the population of the County to be law-abiding, and compares favorably with other counties, especially if it is considered that part of the convicted persons were Indians and United States soldiers, and not, therefore, citizens of the County.

The three great industries of Graham County are, agriculture, mining and stock-breeding.

AGRICULTURE.

There are in Graham County 2,983,310 acres of land (exclusive of Indian and military reservations), of which 758,870 acres are surveyed. Taxes are paid at present on 57,319 acres, and the improvements on the same are valued at \$99,417.65. Although some of this taxed land is not at present under cultivation, still there is much more besides capable of being tilled. Although much of the land in the mountain valleys and canons will not be cultivated for many years to come (being uneven and not susceptible of irrigation without much labor and expense), still, in the broader valleys (especially the Gila), there is as yet much unoccupied land, which can be brought under cultivation with very little expense. Favorable situation for irrigation, and an abundant supply of water, determine almost alone the value of the land for farming purposes. As in the mountain valleys, where water can be had (Eagle creek, Blue, Arivaipa, etc.), only small patches of land can be cultivated, water will there be always abundant; but in the Gila Valley, where nearly all the land can be brought under cultivation, the water supply becomes a serious question. During the first part of the present summer the water in the Gila river has been lower, and consequently the water supply to the valley less than has occurred during the last ten years. Still, no material injury has resulted to the growing crops.

The Gila Valley is essentially agricultural, although some live stock is kept on the more hilly parts. A source of revenue to the valley is the extensive freighting of coke and bullion between the mining camps of Globe and the railroad. All the towns in the valley have daily mails. Fort Thomas is at the western extremity of the valley, and is a military post of three companies, possessing a fine hospital, an ice machine and

a postoffice. The town of Thomas lies east of the post and contains two stores, two restaurants, one hotel, blacksmith and wagon shop, school house, etc.

Small towns and villages are situated on both sides of the Gila river. Curtis lies on the north side of the river and was first settled in 1880. It has about 150 inhabitants, a district school with sixty pupils, a flouring mill and two sorghum mills.

The town of Pima is probably the largest in the County. It is well built, with wide streets that are lined by shade trees. There are several stores, a postoffice, blacksmith and carpenter shops, two school houses, and a fine church in course of erection.

Central, Thatcher and Graham are new settlements, each having a good school house and several stores.

Safford was first settled in 1874, and contains about 200 inhabitants. There are three stores, a flouring mill, blacksmith shop, drug store and postoffice, and a district school with forty pupils.

Solomonville is the County seat, and contains a fine large court house, the County jail, two stores, blacksmith and carpenter shops, postoffice and a district school.

The San Francisco river comes from New Mexico and flows into the Gila, fourteen miles below Clifton; about twenty-five miles of it are in Graham County. The water is pure and abundant. There are a few farms four and one-half miles above Clifton, the remainder of the land is used for grazing. The temperature is a few degrees lower than in the Gila Valley, and about two inches more rain falls. Good wagon roads are all along the river. The towns of Clifton, Morenci and Oro are here, deriving their revenues from the great copper companies in this neighborhood. The town of Duncan is close to the line of New Mexico, and was settled in 1881. It contains about 100 inhabitants, a store, saloon, hotel, restaurant, blacksmith and wagon shop, and a district school with forty pupils. This town derives additional revenues from the Carlisle mines in Grant County, New Mexico.

Eagle creek comes from the White mountains, and flows into the Gila river about twelve miles above Solomonville. About fifty miles of it are in Graham County. The creek contains plenty of excellent water. There is good grazing, but very little land level enough for farming. The temperature is lower and the rainfall more than in the Gila Valley. There is no communication with other parts of the County, except by trail. The pastures support at present about 5500 cattle and 200 horses.

Blue creek rises in the White mountains and empties into the San Francisco about twenty-two miles above Clifton, thirty-five miles of it being in Graham County. There are a few small farms, but very little

land that can be tilled profitably. There are probably 8000 head of cattle near the creek. Temperature and rainfall are as on Eagle creek.

Bonita creek has its source in the Gila range, and flows into the Gila river fourteen miles above Solomonville. It is entirely in Graham County. At its source are parts that may be profitably tilled; the remainder is best adapted to grazing. There are at present on the range about 4000 head of cattle, belonging to the Chiricahua Cattle Company. A good wagon road communicates with Solomonville.

Fort Grant and Taylor's Canon, on the south side of the Graham range, get their supply of water from small mountain streams coming from the Grahams. About 300 acres of land are cultivated. All the rest is used for grazing, about 20,000 head of cattle being in this part of the County. Fort Grant is a military post, and includes, besides commodious quarters for officers and men, fine water works, hospital, ice machine, store, postoffice, etc. The post has telegraphic communication with Fort Thomas. The adjacent country, with the new settlements of Bonita and Taylor's Canon, have a school with about forty pupils.

Stockton Pass connects the south side of the Graham range to the north side by means of a wagon road. The whole pass is too uneven for tillage, but about 4000 cattle find abundant grazing.

Arivaipa canon is a magnificent valley, with fine water and splendid timber. Some land is under cultivation (about 200 acres), the rest devoted to the grazing of cattle. Dunlap is the postoffice.

The best known and most important town in the County is Clifton, near the eastern border. It has a population of 500. It is situated in the Peloncillo spur of the Mogollon mountains on the San Francisco river, which has its rise in the San Francisco mountains, in the northern part of the Territory. The situation of Clifton is most picturesque, being in a deep canon, from which the railroad runs to the mines, at a distance of four and one-half miles.

The mines at Clifton were first discovered by some soldiers of the California column, who had been dispatched to find a road down the Gila River, and coming to a box canon, were obliged to turn back, when they came across the hill on which is located the Longfellow mine, discovering the copper and iron which has since developed into the great copper camp of Clifton. Bennett, Bullard & Metcalf Bros. were the original locators. They afterwards sold to the Lesynski Bros., and they in turn to the Arizona Copper Company, Limited, of Edinburgh, Scotland. This company has expended between \$6,000,000 and \$7,000,000 in the further development of this section of Arizona, \$1,200,000 of which was in the construction and equipment of the Arizona and New Mexico Railroad.

First was built a three-foot gauge railroad from Lordsburg, New Mexico, at a connection with the Southern Pacific, to Clifton, a distance of seventy-one miles. This road in itself is a giant piece of engineering, the grade in reaching the summit of the Peloncillo spur of the Mogollon mountains, seven miles south of Clifton, being forty feet to the mile, and the curves being on an arc of a circle of 32 degrees. The last twelve miles of the Arizona and New Mexico Railroad show quite a feat in engineering skill, there being four tunnels and no less than 172 bridges and culverts. The highest trestle is seventy feet. There have been shipped over this road during the past year 10,541,261 pounds of copper, the product of the Arizona and Detroit Copper Companies.

The most wonderful piece of engineering in connection with this vast property, and for that matter in the world, is the twenty-inch gauge railroad, which runs from the smelter and reduction works at Clifton, up Chase Creek Canon to the mines above. Every little while one reads about the enormous grades on the Rio Grande, in Colorado, or upon the Northern Pacific, in crossing the Rocky mountains, yet none of them compare to this. In the description of the new trans-Andes railroad, in South America, it is said that the grade on the Chili side was in some places 265 feet to the mile, the heaviest grade of any railroad in the world. Right here in our own Territory of Arizona, we have a railroad which far exceeds that. The main line of this twenty-inch railroad is nine miles in length and, with its several branches, has a total length of sixteen miles. In no place on the main line has it a grade less than 200 feet to the mile, while at one point, for a distance of about three furlongs, the grade is at the rate of 303 feet to the mile. The engine and cars for this road were built especially for it in Pittsburgh, Pa. The engines weigh twelve tons each. The cars are of steel, weighing a little over half a ton each, and have a carrying capacity of about three and one-half tons of ore.

Captain U. E. Davis, the engineer in charge of the construction of this road, in speaking of it, said: "I take more pride in this work than any other piece of engineering in all my life. I was one of the engineers in the construction of the Central Pacific, of the Southern Pacific and have had charge of smaller lines. None of these, however, presented obstacles but what any engineer of fairly good skill could solve. But this I consider is a conception. Not only the greatest grades, but the greatest curves, one of the latter being on an arc of 45 degrees, and its successful working setting at naught all the old and prescribed rules of engineering science. I shall always consider this the crowning triumph of my life."

Connected with the twenty-inch gauge railroad are several gravity inclines, reaching to the openings of the mines, hundreds of feet above. One of these, located at the Longfellow mine, is 2200 feet in length, the

elevation in that distance being a little over 800 feet. At the Metcalf mine, the incline is 3300 feet in length, and on an exact angle of 45 degrees, the raise thus being 1650 feet.

From the San Francisco river, about one mile above Clifton, a flume brings a large stream of water to the smelters at Clifton. The water is delivered under an eighteen-foot head to a forty-two-inch Leffel turbine wheel, developing 120-horse-power. This is ample to drive all the machinery of the great smelting and concentrating plant. When the water is insufficient, recourse is had to a 120-horse-power Corliss engine.

The smelting plant consists of three sixty-ton and one forty-ton water jacket furnaces. Beside this, there are concentrating works, capable of working 100 tons of ore a day. Three tiers of great bins have been constructed above the furnaces for the reception of the ores, fluxes and coke required. The coke used is of the first quality, purchased in Pennsylvania and costing in Clifton \$27.50 per ton.

The slag from the furnaces is handled in a manner that is novel and effective. Instead of the great black heap of refuse piled up in front of the smelter, as is usual in nearly all copper camps, the slag is removed by means of a stream of water. The familiar slag pot is missed, the molten matter flowing from the vent to a considerable drop into the flume. By the drop and the contact with the water, the slag is formed into globules and swept away by the rapid current. The end of the flume is fitted up with riffles, which are useful in catching any particles of copper that may have escaped.

The company has large and well appointed office buildings that are remarkable in that they are constructed of slag bricks, 12x6x6, cast directly from the furnaces.

There are about 300 men employed in the mines and reduction works, to whom is paid monthly the sum of \$16,000. The product of copper bullion for the year was 7,200,000 pounds.

At Morenci, situated seven miles from the San Francisco river, at an elevation of about 5200 feet, are located the mines and smelter of the Detroit Copper Company, owned by William Church, who is the president and general manager of the company, and Phelps, Dodge & Co., of New York, the most successful dealers in metal in the United States. The water used in the smelter by this company is pumped from the San Francisco River, a distance of seven miles and raised 1500 feet, a feature which will be interesting to all engineers. A new body of ore has just been uncovered of red oxide of copper, that in appearance is most beautiful. The red crystals are from one to two inches in length.

The ore is capable of being made into the most lovely of ornaments and jewelry.

The forty-ton smelter of the Copper King Mining Company works occasionally upon the ores secured in developing the properties of the company.

Among the gold and silver mines of the vicinity, the Hughes & Shannon property is active and is shipping quite an amount of ore. The Gold Mountain Company, a corporation organized in Clinton, Mo., will commence operations with a five-stamp mill as soon as pending patents to their properties are secured. The company has expended in the last year between sixty and seventy thousand dollars in development work.

In the Greenlee District, a number of copper and gold mines are being developed. J. H. Hovey is operating quite extensively in gold and silver mines in this section. J. G. Hopkins, William Forbes and William Hopkins are operating silver mines at Granville Camp. The Silver Basin silver mines, owned by J. A. Miller, of Silver City, and Charles E. Rand, of Chicago, located about two miles from Morenci, promise favorable development.

The Oro placer mine is located on the San Francisco River. The owner, Bellom, of New York, has expended in improvement and development fully \$250,000. The lack of fall in the river at this point is a serious drawback to the working of this property. Mexicans and Chinese, using the California rockers, are making from \$2 to \$5 each in washing the sands of the stream in the neighborhood.

Vegetable gardens at Oro, ten miles north of Clifton, supply all the surrounding country, even shipping to Lordsburg. Peaches, pears and strawberries thrive in this locality.

At the confluence of the San Francisco and Gila rivers is located the ranch of R. B. Casey, manager of the Champion Cattle Company, and one of the Supervisors of Graham County. The company's headquarters are at Corenado station, on the Arizona and New Mexico Railway. The company has invested over \$100,000 in cattle and ranches since organization and now has about 10,000 head of cattle and 200 head of horses and mules. The beef supply of the vicinity comes from this ranch.

A ditch five miles in length is taken from the Gila, sixteen miles from Clifton. Fifteen hundred acres are under fence and largely cultivated to corn, hay, wheat and vegetables.

York's ranch, twenty-two miles south of Clifton, is renowned in the latest fiction. York and two of his men were killed in 1881 by Apaches and are buried near the house. In 1883 an accepted suitor of

Mrs. York's was killed near by, only three days before the wedding was to take place. This was during the same outbreak in which Judge McComas and wife were killed.

The Gebhardt Cattle Company's station is located eight miles northwest of Duncan. The company has 400 acres under fence and has 10,000 head of cattle and 200 head of horses and mules.

About 1500 acres are under cultivation near Duncan, the products finding ready sale at Clifton.

Stock-raising has assumed grand proportions in Graham County. While the price of livestock was much depressed last year, there is a steady advance at present. The assessment roll enumerates this year 54,880 stock cattle, and it is thought that a further increase is not desirable. The number of cattle at present in the County are doing well in ordinary seasons, but a further increase would produce scarcity of pasturage and water. That the livestock industry is a very profitable business is shown by the increase, which is from 75 to 90 per cent, and by the slight losses, which, with some breeders, have only been nominal, while nowhere have they exceeded 3 per cent.

In the northern part of the County are grand forests of pine, with groves of oak, walnut and other useful woods. It is the intention of the Arizona and New Mexico Railroad to build northward at no distant day, developing these forests and furnishing cheap mining timber. There are now two saw mills in the County, but the hills are so rough that access to them is difficult.

With resources so varied and capabilities so unbounded, the future of Graham County is not a matter of conjecture, and the many advantages offered to the homeseeker will not fail in attracting to her a stream from the tide of immigration.

GILA COUNTY.

THIS, the smallest County in the Territory, occupies a mountain girt portion to the southwest of the center of the Territory and irregularly north of Pinal County. It was organized in 1881 from portions of Pima and Pinal; to its original area was added by Act of the last Legislative Assembly a tract comprising 965 square miles from the southeastern part of Yavapai County, giving to Gila a total expanse of 4365 square miles. The property valuations in the County foot up

\$1,183,472. The more important items are, 49,733 head of stock cattle, valued at \$452,645 ; 7118 acres of land, at \$300,410, and improvements at \$113,875.

The history of Gila County, though it has not extended back so many years, is full of tales of adventure, of the daring deeds of adventurous pioneers, of desperate conflicts with the remorseless Apache, of exciting times with early mining camps, and of riches won and lost.

One of the first expeditions to penetrate what is now Gila County was a force of seventeen miners from the Weaver placer diggings, under command of the celebrated King Woolsey. They were upon the trail of a band of thieving Yavapai Apaches, who had run off a number of their horses. Joined by a party of Maricopa Indians, about equal in number to their own force, they penetrated the wilderness of the Superstition mountains to within a few miles of Globe. Here the little band met apparently the whole Apache nation, but succeeded in escaping, after sending a large number of the mountain redskins to the happy hunting grounds. It should be mentioned that the only reason why the south central portion of the Territory was never afflicted to any extent by Apaches was because of these same Maricopa Indians, hereditary foes of the Apaches, who, with the Pimas, ever kept the mountain marauders back to their native fastnesses.

The Pinals and the Superstition mountains were the scenes of nearly all the more important engagements between the soldiers and Indians. Many were the battles and stern the fights before the fierce redskins acknowledged defeat and submitted to being placed upon reservations.

While the hills of Gila contain nearly every mineral known to man, the County is preeminently a copper producer. In few places in the world is copper ore found in such manner and of so high a grade as in the vicinity of Globe. Great blocks have been mined that have assayed fully 50 per cent copper,* and yet not a trace of the metal could be seen in the turquoise blue of the rock. Unlike the copper mines of the Lake Superior region, Nature here presents but little of the metal in its pure state. Reduction is not difficult, however. The ore is for the most part nearly "self-fluxing." That is to say, the lime and iron that are essential in order to obtain a mixture of minerals that will freely liquefy in the furnace are found in conjunction with the copper ores. The Old Globe mine, the pioneer of the camp, is especially remarkable in this respect. So free are its ores, well combined by Nature with a manganese iron, that a thirty-ton water-jacket furnace has been made to handle fifty-four tons in one day, turning out, even under such a pressure, twenty-two pounds of almost pure copper to every 100 pounds of ore fed to it. There are few mining districts that can show practical results equal to this.

The Old Dominion Copper Company owns the Old Globe, as also the Old Dominion, Borva, New York and a dozen other claims, several of them of high merit. The Old Globe, on the hillside a short distance above the smelters, on the outskirts of the town of Globe, is the main property at present worked. This property, embracing a number of claims, is extensively developed, tunnels and shafts penetrating the ledge matter at many points. The ore seems to be of almost uniform grade, ranging above 12 per cent. The main vein is a vast body of ore, seeming practically inexhaustible. Some trouble has been had during the year with water, but by means of a drain tunnel and powerful pumps no further check is expected from that source.

The company's reduction works consist of three thirty-ton water-jacket furnaces, well situated upon the bank of Pinal creek. Their output of bullion for the past three years was as follows: 1888, 4,600,000 pounds; 1889, 5,915,310 pounds; 1890, 7,720,015 pounds. The low prices of copper a few years ago caused almost a cessation of the works of this great company, but now, under the stimulus of high rates and active demand, the Old Dominion is again leading Globe to prosperity.

In the lively days from 1879 to 1882 the smelters of the Buffalo, Hoosier and Tacoma Companies were active.

The Buffalo mine is now being newly developed by a large force of men, a new body of rich and free smelting ore having been uncovered, and at last accounts the smelter was to resume operations at once. The other copper companies are expected to follow before many months.

The most serious drawback to copper mining in Gila County is the difficulty of transportation and the great cost of shipping in coke and supplies and shipping bullion out. The major portion of the traffic is now by way of Wilcox, in Cochise County. Here the coke from Trinidad, Col., is transferred from the cars to the great, high-sided freight wagons, which then take up the weary journey of 130 miles. The road is none of the best. It is through the San Carlos reservation, and long teams of wagons are frequently parked at the ford of the Gila, waiting for that capricious stream to subside, while the smelters in the copper camp have closed down for want of fuel. The Globe trade being of much importance, somewhat of a rivalry has sprung up among the railroad points of Southern Arizona for its possession. Bowie station claims it, Tucson is preparing to expend a large sum in the construction of a road northward to Globe, Florence has surveyed a route from Casa Grande around the western edge of the Pinals, and Tempe is designing the construction of a road across Hayden's Pass, in the eastern Superstitions. The last named point would be the nearest to railroad transportation, but whether it would be as economical for the transportation of coke is a question. It is probable that all the roads

outlined will be constructed, as they are needed in the development of the country. The coke question will, no doubt, be settled before long by the opening of the Deer Creek coal fields in Graham and Pinal Counties.

There is no other town in Arizona that would be as profitable to a railroad as Globe. Railway transportation, cheap, speedy and sure, would allow of the operation of many low-grade copper properties of large extent that cannot now be worked in consequence of the high rates of freight and excessive cost of supplies. A dozen furnaces would be blown in upon the approach of a railroad and Globe would take a place second to no other mining camp in the Union.

The silver mines of Gila have had a high reputation, but are now, for the most part, dormant. The Silver Nugget, at Richmond Basin, gained celebrity from the fact that its discoverers carted off from the surface of the claim a hundred thousand dollars or more in almost pure silver. The Mack Morris mine near by, after extensive development and many dividends, closed down a few years ago. The Centennial, the Golden Eagle, the South Pioneer, the Stonewall Jackson, though once productive to a wonderful degree, are now idle. A number of these mines have excellent reduction works, which are occasionally used for the milling of small lots of ore dug out by chloriders. A fine run was made during the spring by the Centennial mill on a lot of Fame ore, and only this mine and a few others are in operation at the present time among the silver properties. Some good prospects have been found on the northern slope of the Mazatzal Mountains and around the "Rim" but no extensive development work has been done.

The agricultural lands of Gila County are quite limited in extent. In the San Carlos Reservation, which occupies nearly one-half of the County's area, are some good lands, minute portions of which are farmed by the Apaches. Twelve miles down Pinal creek from Globe, at a point where there is water in the driest season, is what is known as Wheatfields. Here are several hundred acres of fertile, alluvial soil in the canon bottom that are carefully tilled to crops of vegetables and hay. The land is, by reason of its limited extent and nearness to a profitable market, held at a very high valuation.

Climbing the "divide" on a steep, but otherwise excellent mountain road, the valley of the upper Salt river and lower Tonto creek is presented to view, a magnificent prospect, indeed. Here, within sight from the "divide" lies nearly all the farming land of the County. From the mouth of Pinto creek, into which the road descends, by a circuitous sweep, to the box canon of Salt river is about fifteen miles. In that distance, on either side of the river are appropriated and

fenced probably 3000 acres, of which about one-third is under cultivation to cereals. The population divide their attention between agriculture and stock raising. Armer is the postoffice. Barley is the principal product, though a flour mill is projected, for supplying which an added acreage of wheat would be planted. Five or six ditches are taken from the river, which supplies abundant water during the whole year.

Tonto Creek joins its waters with those of Salt River, immediately above the box canon. The valley of Tonto Creek is a broad one and is occupied along the stream for twenty miles by the ranches of cattlemen, who usually seek to raise but little beside hay.

These valleys, for a distance of sixteen miles up Salt river and ten miles up Tonto creek, would be covered with water were the projected 200-foot dam placed at the head of Salt River canon. The formation of such a great lake would be of real benefit to the County, the advantages of its possession far more than compensating for the amount of agricultural land that the waters would cover. These two streams carry an enormous amount of water in the spring, when the snows are melting in the lofty mountains at their sources, and the reservoir would never fail of more than filling at that season.

This section of the County is especially rich in relics of the ancient races. Upon almost every hilltop there is a circular stone structure, usually of no considerable size, that seems to have been either a watch tower or a miniature temple, from the height of which the Toltecs caught the first rays of the sun—deified and personified by them as the supreme and guiding god-head of the universe. Upon a number of jutting cliffs are what were undeniably fortresses, built to overlook the valley below, with parapets of flat stone built high to the very edge of the chasm, and exterior defenses commanding all approaches. A short distance below Greenback creek, on the mesa, is an immense ruin. The walls are yet standing to the height of perhaps eight feet, covered with debris. This structure was built for the most part, of gypsum, a large deposit of which underlies the country in this neighborhood, cropping out where cut by the wash of the streams. Several old irrigating canals can be traced in the vicinity, which must have required no mean engineering skill in order to attain the top of the table lands. The pottery found is similar in appearance to that upon the ruins of the Salt River Valley, though perhaps not as well finished. All along the small streams of the vicinity are marked out in cobble-stones long stretches of connected enclosures that must have been rooms of pueblo houses. Some of these houses are as long as half a mile, though but of little width. The soil accretions of centuries have been sufficient to cover these old dwellings, until now the sites are but slightly marked on the edges of the lower mesas.

The most interesting evidences of these ancient people are to be found a few miles south of Armer postoffice. Far up a narrow canon, and reached only after an exhausting climb up its almost precipitous sides, are a number of cliff dwellings. They are all constructed after much the same plan. In the contact between a sandstone stratum and the more ancient formation that underlies it, several large caves have been left, somewhat of the shape of an open oyster shell. Across the wide mouth of each opening was built a high wall of cement and the interior was divided off into rooms by partitions of the same material. In the largest of the dwellings, a portion of the front wall had fallen, permitting ingress without much difficulty, but the manner in which its ancient inhabitants entered was, doubtless, by means of a ladder up the face of a section of the cliff, perhaps twenty feet in height, to the floor level and then into the house from the top by means of another ladder. Surely, when the ladders were drawn up the houses were secure refuges from any foes of that day. Indeed, nothing short of a rifled cannon would prove effective against them even now. The largest cave is, approximately, 100 feet long, 40 feet deep and 20 feet in height, at the face. There are within about a dozen rooms, arranged upon three floors. The floors are made of neatly dressed cedar logs, crossed by giant cactus ribs, and upon these flags and a dressing of clay. The upper room was more in the nature of a gallery, as the front wall did not reach the roof by several feet. Some evil-disposed person, at a recent date, had set fire to the woodwork in one of the rooms, but the flames did not spread and were destructive only in that one apartment. In one of the ground-floor rooms, covered with dirt, was found a great quantity of corn cobs, though it is probable that they were left by Apaches, rather than by the prehistoric occupants. The woodwork is in excellent preservation. The conditions favorable to the preservation of all relics of the by-gone era could nowhere be more nearly perfect, for through all the ages, not a drop of moisture could touch the contents of the caves. It would seem probable that these caves were used simply as refuges by the people of the valleys, and that they were kept guarded and victualled in readiness for the coming of the foe.

The main highway of Gila County follows the course of Tonto creek for about twenty-five miles. This valley is a beautiful one, flanked on the west by the lofty Mazatzals, the Four Peaks of which rise to a height that gives them prominence for hundreds of miles in every direction. On the east are the forest-crowned Sierra Anchas, and beyond the imposing rim of the Mogollons stands out in sharp relief. This rim is a continuous cliff that for over a hundred miles forms the boundary of the Mogollon group of mountains, and is a natural feature both strange and grand.

About twenty miles from the mouth of Tonto creek a road turns off to the left, leading to Phoenix by way of old Fort Reno and Fort

McDowell. This highway is of little use, however, as its track across the steep and rocky Reno Pass is annually torn out by the rush of water down the narrow gorge. Most of the supplies for this region are brought by pack mules across the mountains from the Salt River Valley.

Camp Reno has been long ago abandoned, but was an important post in the times before the Tonto Apaches were removed to the San Carlos reservation.

In the hills to the east and northeast of the course of Tonto creek are a number of fertile valleys, small portions of which are tilled around the homes of the resident cattlemen. In Greenback Valley there is a considerable expanse of agricultural land tilled for corn and hay. Pleasant Valley has been the scene of many troublous times in past days. It was on the route of many Indian raids, and stirring episodes of Apache battles are many. All these are now passed into history, and the valley is now remarkable only for its many natural beauties.

One of the greatest natural curiosities of the world is embraced within the section of mountain country lately set aside from Yavapai. The Natural Bridge of Pine creek, an arch carved by the forces of Nature in their grandest play, will yet be the Mecca of the tourist from every portion of the Union. It is situated about seven miles from the little settlement of Mazatzal City and about the same distance from the lumber camp of Pine. The bridge, though upon the grandest scale, is well hidden from view from nearly all points upon the hills above, and not until the stranger arrives at the lip of the deep gorge that lies concealed at the bottom of the valley does the vast cavern come to sight, with the stream rippling in its bed. The top of the bridge, about ten acres in extent, meets the hills on either side, and is being utilized by the owner of the property as a garden and orchard. The cavern below is in the shape of a bow, apparently supported by two grand arches that join in a mighty column on the convex side. From the bed of the boulder-strewn stream to the roof is about 160 feet; the arch will average 80 feet in width, and the length of the great tunnel is nearly 500 feet.

The material of the bridge is limestone, which has been fluted and carved by the action of water into many grand and beautiful shapes. Nor is the grotesque missing, for the imaginative may see at every turn projections that are oddly suggestive of many forms of animal and vegetable life.

Far up under the roof, reached by means of ladders, is a lengthy cave, leading far back under the western hill. There is, opening upon the lower canon, almost below the upper wing of the bridge, a labyrinth of caves, which are almost as interesting as the bridge itself. The

caves have not been thoroughly explored, but extend back thousands of feet. Gowan, the owner of this "two-storied ranch," has spent weeks in underground travel, and there yet remain a number of caves which he has not yet visited.

One especial peculiarity of this mysterious and uncanny neighborhood is the fact that the waters of several springs above have the property of petrifying all objects with which they come into contact. Over the brink of the cliff the waters drip, gradually turning to a silicate of lime the vegetation below. Moss grows in luxuriance upon the cliff in long festoons, the outermost being green and thrifty, the second yellowed with a coating of lime, and the third and inner line completely petrified, the delicate lace-like tracery of the moss showing beautifully distinct in its mineral counterfeit. And thus the cliff creeps forward and the caverns are lengthened. Mr. Gowan states that these petrifications extend to the farthest depths of the caves he has explored.

One remarkable petrification is a cedar tree, broken off about sixteen feet from the ground. It is but a few feet from the cliff and the falling spray has not as yet done its full work. The exposed roots and a few short limbs have been turned to stone, and the vegetable matter of the stump has nearly disappeared.

These, briefly sketched, are the attractions offered by the Natural Bridge to the curious and to the lovers of Nature's sublimest beauties. The pathway may be rough and the journey arduous, but none will ever regret a brief visit to this spot.

Twelve miles to the east lies the thriving little village of Payson, the centre of extensive cattle ranges, and a place that will be important when the long-looked-for railroad makes its appearance.

The Mineral Belt, or as it is now called, the Arizona Central Railway, is designed to run from Flagstaff to Globe and to Phoenix. Dropping from the lofty Mogollon plateau to the level of Tonto Basin has been found to involve many engineering difficulties, but it is understood that all have been overcome, and that construction southward will be soon resumed. The Globe branch will keep to the line of Tonto creek to its mouth, thence to Pinal creek and up the canon of that stream to Globe. The Phoenix wing will either skirt the northern edge of the Mazatzals, into the Verde Valley, or will leave the other line at the mouth of Tonto creek and follow down Salt river to Phoenix.

Good timber is to be had around Pine, on the northern slope of the Mazatzals, in the Pinal Mountains, near Globe, and on the Sierra Anchas. This last-mentioned timber region is of especial excellence, and, being easily accessible from Salt River, there seem to be no obstacles in the way of floating the logs down Salt River, even to Phoenix.

In the eastern portion of the County, on Salt River, are several salt springs of great strength, that in early years were drawn upon by the Apaches for their supply of this necessary article. Numerous salt deposits are to be found in the mountains near-by, and may, in future years, contribute to the County's wealth.

The eastern third of Gila County is within the White Mountain reservation, where the Apaches are herded under the charge of army officers. While of late small parties of especially criminal Apaches have broken away from the reservation and started a murderous career to the southward, none direct their warpath into the white man's portion of Gila County, for they have learned by dear experience that the neighborhood is unhealthy for people of their color.

The reservation in all embraces about 300,000 acres of land, less than 1000 of which is cultivated, although the aborigines are supplied by the Government with all the necessary tools for agricultural work. Now that the worst element of the Chiricahuas and old Geronimo's band are gone, it is possible that the Apache may be compelled to turn his attention from rapine to husbandry.

Globe, the County seat of Gila, is a town of about 1500 inhabitants, though the rush incident to the renewed activity of its mines may have brought in a floating class of several hundred men. It is especially thriving at present, owing to the high price of copper. The town is situated along Pinal creek, the main street being lined with all the various business houses necessary to a thriving trade. Globe has good schools, several churches and a number of secret societies. The *Silver Belt*, ably edited by that old pioneer, Judge A. H. Hackney, now prospers with the camp and ably voices the capabilities of a County that has many attractions.

COCHISE COUNTY.

COCHISE County occupies the southeastern portion of Arizona. It has an area of 5925 square miles. The total valuation of property within the County is \$2,981,719. Of this, 89,272 acres of land are listed at \$94,551, with improvements rated at \$431,649. There are within the County 83,792 head of cattle, valued at \$691,041.

Mining is the principal industry of the County, though the boom days of yore have departed and left behind but a spirit of careful development under which the mines will soon again show great results in

the production of silver. The silver legislation of the present Congress is somewhat stimulating to the energy of the owners of silver properties.

Prior to 1878 the country beyond the San Pedro was given over to a domination of the Apache outside of the one traveled wagon road to the east. The grassy plains and hills were bare of cattle, and its mineral treasures were but in the imagination of the curious. In February, 1878, Ed. Schieffelin, a prospector, who had tramped much of the Territory in vain, stumbled across the croppings of what is now known as the Toughnut mine and located several claims upon the ledge. It was about the time that the Comstocks and Bodie were showing signs of collapse, and the miners of the coast flocked by the hundreds to the new discovery. A city of tents sprang up, and by June of 1879 a stamp mill was in operation. The mines had not been overrated; they were veritable bonanzas, and during their season of activity have produced over \$25,000,000, about \$5,000,000 of which took the form of dividends to the stockholders. Fully \$7,000,000 more was spent upon hoisting plants and milling machinery. Up to 1885 was the busy time, when the burning of the hoisting works of the Grand Central mine cast a gloom over the camp, and the water gained upon the miners and the main properties were closed down for a long season of inactivity. The ore on the lower levels is of high grade, and there yet remain vast quantities of it. But to reach the ore it would be necessary to inaugurate a combination pumping plant that would cost in the neighborhood of \$1,000,000, and this expense the mine owners are not inclined to put upon themselves until assured of the future of silver. With a combination of capital the mines will yet be cleared of water and operations resumed on as grand a scale as ever before.

Tombstone has thrived through all vicissitudes. Twice the scene of destructive conflagrations, the town rose each time in added strength. It now contains about 2500 inhabitants, of a superior class, who, while waiting for a resumption of work upon the larger mines, manage to prosper under present conditions. There are a number of handsome buildings, the court house being especially notable, it being the finest structure of the kind in the Territory. There are also worthy of especial mention the city hall, public school, a commodious hotel, and several church structures. The Catholics, Methodists, Episcopalians and Baptists hold regular services. A number of secret societies are represented. The city has the best water system in the Territory, pure spring water being brought from the Huachuca Mountains, a distance of twenty-two miles, and delivered at the city hydrants under a pressure of 150 feet, sufficient to throw a stream over the top of the highest building in town.

The newspaper field is well filled by the *Prospector*, daily, and the *Epitaph*, weekly.

Next to Tombstone, the most important point in the County is Bisbee, situated in a narrow canon in the Mule Mountains, about thirty miles north of Tombstone. Here are located the works of the Copper Queen mine, the greatest producer of that metal in the Territory. The company keep four furnaces in almost constant operation; three of them are of the capacity of 55 tons each, and the other is a monster, capable of smelting 150 tons per day. The furnaces turn out daily between twenty-five and thirty tons of ore. The copper production for the past year was not far from 12,000,000 pounds of bullion. Transportation is afforded for the incoming coke and supplies and for the bullion exports by a railroad recently constructed from Fairbanks on the Sonora Railway.

The mines of the company are upon a magnificent body of ore that seems practically exhaustless. That it is rich is clearly shown by the bullion produced. The properties are provided with the most improved machinery, and are lighted throughout by means of electricity. About 600 men are employed.

The company has full charge of the townsite and has made of it the model camp of the Union. Sanitary measures are strictly enforced and careful attention given to the welfare of every employee of the great works.

A hospital and a fine library and reading room are maintained by the company for the use of the men. A clergyman who is regularly in the employ of the company, holds union services on Sunday and attends to the moral welfare of the employees.

The public school is in a commodious and well-appointed building provided by the company, which also liberally aids in defraying the annual expenditures for the school's maintenance. Three teachers are employed, the average attendance being over eighty pupils.

The town has a population of about 1500. It is built along the bottom of the narrow gorge, and has been subjected to several damaging floods. Drinking water is supplied by wagon from springs in the mountains. Water for irrigating is piped throughout the town from a tank upon the hillside, to which water from the mine is pumped.

The secret societies embrace the Odd Fellows, Workmen, Patriotic Order Sons of America, Knights of Pythias, Grand Army of the Republic and a temperance organization, all apparently in a flourishing condition.

A number of other copper properties are more or less developed in

the vicinity of Bisbee and several other smelting plants have been in operation, but all are overshadowed by their great neighbor.

Fairbanks, at the junction of the Bisbee railroad with the main Sonora line, is important only from that circumstance and from its position as the forwarding point to Tombstone, eight miles distant.

The Sonora road joins the Southern Pacific at Benson. This is a brisk little town on the San Pedro, the supply point for a large section of agricultural and grazing land, and considerable importance from a railroad point of view. A large smelter is located near the town, but is not in operation for much of the time.

There are in the San Pedro Valley within the County about 6000 acres under cultivation, though that amount is but a small portion of what might be tilled were the winter waters of the stream saved for use upon the fields during the dry season. In regard to the products of the San Pedro Valley, as indicative of the agricultural capabilities of Cochise County, the following is presented from the Tombstone *Prospector*:

"The average wheat crop is from 30 to 35 bushels to the acre, and brings from \$1.75 to \$2 per bushel. Barley will average from 60 to 80 bushels to the acre, and brings \$2 per 100 pounds. After this crop is harvested the ground can be plowed and planted in either corn, beans or potatoes, and another crop raised from the same ground. Oats yield from 50 to 70 bushels to the acre; and another feature in the raising of oats is this, that when the oats are about two-thirds grown they can be cut for hay and the stalks will grow again and a full crop of oats harvested. If the crop should mature before cutting, another crop would have to be sown, as the stalks die upon the ripening of the grain. Oats sell at from \$2.50 to \$3 per 100 pounds, and oat hay always commands a ready sale at \$15 to \$18 per ton.

"Corn yields a good crop and always finds a ready market. Potatoes planted upon the bottom or valley lands do not do as well, or yield as large a crop as in the foothills near the mountains, where the quality is far better and the quantity much larger, the average yield being from ten to twelve tons per acre. Sweet potatoes are raised in the lower valley lands and are very prolific, more so than the Irish potato. Beans can be raised upon both the valley and table lands, and are considered a sure crop and average 1500 pounds per acre. They sell for from \$3 to \$4 per 100 pounds.

"We have not been able to give the production per acre of grapes, or the different varieties of fruit, as there have been thus far no large vineyards or orchards, but estimating the yield by the different bearing vines examined, it would be over 3000 pounds of fruit per acre for grapes, and for apricots and peaches, five tons per acre.

"Squashes, pumpkins, melons, cucumbers and all varieties of vegetables give large returns for the labor in raising them and bring a ready market.

"Among the varieties of hay cultivated are millet and alfalfa. Millet can be cut four or five times per year, and averages two tons to the acre and is readily sold for \$13 per ton. Alfalfa, being one of the most profitable grasses raised, has nearly supplanted all others. It is cut four or five times a year and averages from one and three-fourths to two tons per acre, and sells for \$14 per ton. Beside the large number of acres grazed, there are cut in the San Pedro, Sulphur Spring and San Simon Valleys thousands of tons that command at all times a ready sale. Where the alfalfa fields are grazed they will support two head of cattle or horses the year round, or about six head of sheep or hogs to the acre, and the uniform price charged for pasturing cattle or horses is \$1 per head per month. Alfalfa cut and fed from ricks will keep three head of cattle per acre through the year. The native hay that grows so luxuriantly upon the rolling hills, and in the many flat washes throughout the County, and ripens in so short a time after our summer rains, produces from one to two tons per acre and brings from \$13 to \$15 per ton, and finds a ready market. The foothills on each side of the mountains are covered with nutritious grasses most of the year, which render them valuable for grazing purposes. San Simon Valley, as well as the Sulphur Spring Valley, is covered with a luxuriant grass growth, which makes them the finest cattle ranges in Arizona. In Sulphur Spring Valley there are no running streams, but water is abundant and near the surface, and in some places gives the appearance of wet lands.

"Water underlies the surface but a few feet for much of the valley's extent, many flowing wells having been developed at an inconsiderable depth. Water storage in the canons and pumping from wells will yet prove effective in reclaiming the entirety of the valley to the uses of agriculture.

"The markets for the products raised in this County are at the military posts, and in the towns and mining camps, which readily consume all the products produced and for sale. In this County there is a market for all the fruit, vegetables and produce that can be raised. Prices are higher than anywhere else in Arizona. Peaches, apricots, plums, and fruit of a similar kind, are worth 10 cents per pound through the season, while early fruits can readily be sold for 25 cents per pound. Cherries bring 25 cents per pound any time during the season. It should be borne in mind by those who read this article that there are but two months in the year that irrigation is necessary. The heavy rains of July, August and September are sufficient to cause a rapid growth of vegetable matter, these being the months in which nature

takes on her new dress of verdure, when valley and mountain are alike covered with succulent grasses, Cochise County offers to the immigrant more advantages and a quicker and better return for the result of his toil than any other section of this Southwest country. Thousands of acres of land can be had along the foothills of the mountain ranges, where the soil is only awaiting the hand of man to bring forth abundantly of the fruits of the earth."

In the eastern part of the County lies the great Sulphur Spring Valley, in which it is estimated are about 200,000 acres of land suitable for cultivation were the mountain waters impounded to the extent of furnishing a supply during the several dry months. There are at present only about 2000 acres under cultivation of all this vast tract, though the soil for almost the whole extent is unsurpassed. It is estimated that the valley and adjacent hills support no less than 125,000 head of cattle. As there are but 83,792 reported to the Assessor for the entire County, this looks something like a revision of the old algebraic axiom that the whole must be greater than any of its parts, but then it would be a manifest impossibility for the Assessor to round-up and sort out all the cattle upon a thousand hills.

To the north of the main Sulphur Spring Valley lies the thriving town of Wilcox, upon the Southern Pacific Railroad. It has three large general merchandise establishments, a hotel, extensive blacksmith and wagon shops, lumber yards, and all the attributes of a prosperous settlement. The Christian element are represented by a Catholic and a Methodist church. There is an excellent public school, with an attendance of about sixty pupils. The *Southwestern Stockman* is published in Wilcox. This paper fills the broad field of the only stockman's journal in Arizona.

The town is the supply point for the great ranges of the vicinity, as well as for a number of promising mining districts. At this point the coke for the great copper camp of Globe is transferred to wagons. It is also the forwarding point for the military posts of Grant, Thomas, Bowie and San Carlos.

The progressive citizens of Wilcox are losing no opportunities for the development of the great agricultural capabilities of their locality. They appreciate the fact that, with the occupation of the Sulphur Spring Valley by an agricultural class, their town would become one of the foremost cities of the Territory.

A movement is on foot to bore for artesian water, the promoters of the enterprise feeling confident that an abundant flow can be secured. Artesian water would be of great benefit to Wilcox, in an agricultural way, the private gardens of the vicinity being ample evidence of the fertility of the soil.

Easily reached from Wilcox are Hooker's Hot Springs, which are attracting not a few invalids to experience the beneficial effects of the waters. Of these springs the *Southwestern Stockman* says:

"Though the springs are not as far-famed as the celebrated hot springs of Arkansas, we verily believe their waters possess medicinal qualities fully equal to those of Arkansas, and that will in time give them a reputation as wide-reaching. Hooker's Hot Springs are situated about thirty miles west of Wilcox, in Hot Springs mountains, a southern continuation of the Galluria range, and the health-giving and health-restoring properties of the waters have been known in this section of Arizona for many years. So far as we are aware, no chemical analysis has ever been made of their waters, but magnesia and iron predominate in the waters of the hot springs, six in number. There is also a cold sulphur spring in close proximity to one of the hot springs. The waters of the springs are especially efficacious in rheumatic and similar cases, and people who have gone there suffering great agony and almost entirely disabled from rheumatism have been restored to perfect health. These springs are owned by Col. H. C. Hooker, of the Sierra Bonita ranch, from whom they take their name, and are conducted by a lessee. Hooker's Hot Springs are destined to become noted among the great health resorts of this country, and such time will come as soon as the merits of the waters become generally known. In closing, we would state that the climate there is delightful at all seasons of the year."

Teviston is in the northeast corner of the County, in the San Simon Valley. This valley is about sixty-five miles long, in Cochise County, and will average about twenty miles wide. It would be an excellent agricultural valley if water were more abundant. At present about 200 acres are cultivated by the stockmen at their ranches, watered from San Simon creek. At Teviston Captain Tevis has an orchard of several acres, which is watered from the railroad well at Bowie Station. Mr. Tevis has twenty-two varieties of fruits growing in this orchard, every one of which is flourishing well and bearing fruit. The trees have been planted eight years. Peaches, pears, plums, nectarines, apricots, mulberries, figs, cherries, quinces, a number of varieties of grapes, almonds and English walnuts, all are doing well. The San Simon Valley lies between Stein's Peak range of mountains and the Chiracahua mountains, and in both of these ranges are deep canons suitable for the storage of water. The valley is covered with white and black gramma grasses, making excellent food for stock.

The Virginia Chief group of mines, located eight miles southwest of Teviston, in the Chiracahua range, are now in active operation. On the property is a Grayer dry concentrating works of forty tons capacity.

The ore is carried from the mine to the concentrating works by means of an endless tramway (Huson's) which runs automatically. The ore is not touched by hand from the time it leaves the stopes until it reaches the crusher. About sixty men are employed in the mine and works. The ore is gold, silver and lead and will average about \$30 per ton. It is concentrated eight into one. The mines are opened by 700 feet of shafts, drifts and tunnels, and development work is still being pushed.

Dos Cabezas Mining District, in Cochise County, contains a great many good mines of low-grade gold ore. The ledges are from two to twenty-five feet wide and all free milling.

Turquoise, in the Turquoise Mining District, in the Dragoon mountains, is one of the most prosperous mining camps in Cochise County. The ores are principally silver.

About eighteen miles southeast of Bowie Station is Fort Bowie, a military post embracing within its reservation the famous Apache Pass, once dreaded by the emigrant over the southern route to California. The pass was abandoned for travel after the advent of the railroad. The post is well situated for heading off any Apache bands that may start on the warpath toward Mexico. Of late years, however, its garrison has had little employment.

The most important military post in Arizona is located in the southwestern part of the Territory, Fort Huachuca, in the mountains of the same name. It is situated amid lovely mountain scenery, and at an altitude that renders the summer climate delightful. The intention of the military authorities is to abolish all the smaller posts, now that their usefulness has gone with the subjugation of the hostile Indians of the Territory, and to concentrate the troops in large bodies at strategic points, easily accessible by railroad. In the sifting process, Forts Huachuca and Grant appear to be the only ones that will be left in Southern Arizona.

On the San Pedro, near the line of the Sonora Railroad, is the flourishing agricultural settlement of St. Davids, which supplies Tombstone and the surrounding camps with much of the vegetables, hay, etc., consumed by them. At Contention and Charleston, farther up the river, to the southward, are a number of milling and smelting plants, once used in reducing the ores of Tombstone District, but now idle. The San Pedro has its source in Mexico, and for its entire length, until it flows into the Gila, offers to the immigrant opportunities for the appropriation of excellent farming lands.

There are in the Huachuca mountains, the Santa Catalinas and the Chiracahnas extensive forests of pine timber of good quality, while oak, cedar and mesquite is abundant and easily reached.

In the last six years the County has been entirely redeemed from the wild reputation it before bore as a region terrorized by Apaches and equally wild cowboys. Its criminal record would be creditable to many an Eastern County, and its people are intelligent and energetic in pushing the interests of themselves and their community.

The petulant pop of the pistol is no longer heard, and, while the excitement of the boom days of yore may be missed, while the spice of frontier life may be largely lacking, there remains the solid enterprise and the substantial progress that marks the thrifty community and invites with assurance the immigrant. Cochise has known wild days, when the necessity of carrying arms against the Apaches led to the frequent exercise of violence among the whites, but those times are now but the matter of history. The Apaches are under military rule, subdued, and with their wildest tribesmen missing; the cowboy is now as respectable a citizen as the average farmer of the Eastern States, and the miners have dropped the pick to seize the plow. Cochise offers to the home-seekers opportunities not excelled by any other of the Territory, and her future is a matter over which there need be no conjecture.

THE SCHOOL SYSTEM.

ONE of the first questions to be asked about a new country by the intending immigrant is, "What sort of schools have you?" No State or Territory in the Union has a better public school system than Arizona. Hon. George W. Cheyney, of Tombstone, Superintendent of Public Instruction, prepared an excellent article on Arizona Schools for the author, which is herewith given in full:

The public school system of the Territory is an excellent one, modeled largely on that of California, but drawing upon the best results of the experience of the older States.

The ultimate authority is vested in the Territorial Board of Education, composed of the Governor, the Treasurer and the Superintendent of Public Instruction, the last named being the Secretary of the Board. Upon this Board devolves the duty of making all regulations for the conduct of the schools not provided for by statute, and the issuance of life diplomas to teachers. As by the comity of States a life diploma issued by one is usually accepted by all the others as *prima facie* evidence of full educational qualification, this is an important power.

Next in authority comes the Territorial Board of Examiners, composed of the Superintendent of Public Instruction and two members appointed by him. Upon this Board devolves the duty of fixing the qualifications of teachers and standard of attainments. With this Board also rests the final decision on all such matters.

The County Board of Examiners examines and issues certificates to teachers within each respective County. It is composed of the County Superintendent and two members appointed by the Territorial Superintendent. The County Superintendent, who is also Probate Judge, and the Board of Trustees in each district are elected—the Superintendent biennially at the general election, the Trustees annually at an especial election held upon the last Saturday in June. For the election of School Trustees, women, if they are parents or guardians of children of school age, are qualified voters.

Until 1883 the school age in the Territory was from 6 to 21; since then from 6 to 18, and all children between those ages, without respect to color or race, are entitled to an admission into the schools and an education. If unable to procure text books, they are furnished them by the district.

In 1888, there were, according to the biennial census taken for that purpose, 9360 children between the ages of 6 and 21; in 1885, between the ages of 6 and 18, there were 10,219, and in 1890 there were 12,882.

In round numbers, one-third of the children attend the public schools, the percentage for 1890 being 36 5-10.

A school month in the Territory consists of four weeks of five days each, and although in the cities and towns, schools are maintained for nine and frequently ten months, the average for the Territory is between six and seven months. Districts must maintain a school for five months in order to secure the proportion of County moneys to which they are otherwise entitled.

In 1890, there were in the Territory 187 school districts, containing 219 schools and employing 240 teachers, of whom 93 were male and 147 female. These teachers were paid as an average, the male \$82.45 per month and the female \$74.45 per month, or, on an average for all teachers employed, of \$77 per school month. The law fixes, as a maximum, \$125 per month to teachers holding first grade certificates and qualified to teach a grammar school, and to those holding second grade certificates, \$90 per month. There was expended in the Territory during the year ending June 30, 1890, the sum of \$177,843.83 for the maintenance of the schools. The erection of school houses is provided for by an especial tax, which must be levied upon and paid by the property in the particular district in which the building is erected. The school fund is the result, mainly, of a tax upon all the property of the County and is fixed by a law at a minimum of 50 cents per \$100 of assessed property. To this is added funds obtained by poll tax, gamblers' and liquor licenses, etc. It is then divided for the district in proportion to the number of children therein, as ascertained by the census, but every district two miles in extent and having at least ten census children, is entitled to \$400 annually. It will be seen that the Territory has provided liberally for the education of its children, and has planned that none shall be deprived of an opportunity for improvement. Teachers are liberally paid with the intent that the best possible talent shall be secured and that the Arizona public schools shall rank with the highest.

The school buildings are, in a great many instances, models of convenience and comfort, supplied with the best of furniture and apparatus, and while in the younger and sparsely populated regions not all that could be desired, will compare favorably with those elsewhere.

School libraries are gradually growing, and at the present time twenty-four districts have secured a start. In volumes they number 2261. The total value of school property in the Territory, including buildings and grounds, amounted in 1890 to \$268,435, having increased since 1887 from \$176,238. Before that time complete records are not available. The cost per child has ranged in the past eight years from \$5.01, the lowest, in 1888, to \$7.03, the highest, in 1884. This is estimated upon the average attendance, and not the whole number of children. As the attendance increases this ratio will be reduced.

LAND LAWS.

THERE are two land offices in Arizona wherein is transacted business appertaining to the acquiring of title to land belonging to the United States. One land office is located at Prescott, in Yavapai County, which has jurisdiction over the public land in Arizona located north of the first standard north, and the land office having jurisdiction over the land south of the first standard north is located at Tucson.

Title to the lands belonging to the Government may be secured under the homestead, pre-emption, timber culture, desert and mineral land acts, and when the Government offers tracts of land, title may be secured by purchase.

HOMESTEADS.

A homestead entryman must be the head of a family, or a person who has arrived at the age of twenty-one years and a citizen of the United States, or one who has filed his declaration of intention to become such, as required by the naturalization laws. Such qualified persons can acquire title to not exceeding one quarter section, or 160 acres of public land by establishing and maintaining residence thereon and improving and cultivating the land for the continuous period of five years. Thus a home may be secured by the industrious husbandman, without further cost than land office fees.

Lands subject to homestead entry are such as under existing laws are subject to pre-emption. When a person desires to enter a tract of land upon which he has not established a residence and made improvements, he must appear personally at the district land office and present his application, and must make the required affidavits before the Register or Receiver. The homestead affidavit can be made before the Clerk of the County Court in cases where the family of the applicant, or some member thereof, is actually residing on the land, which he desires to enter, and on which he has made bona fide improvement and settlement, and when he is prevented by reason of distance, bodily infirmity or other good cause, from personal attendance at the District Land Office.

A man in active service in the army or navy of the United States, whose family, or some member thereof, is residing on the land which he wishes to enter, and upon which a bona fide settlement and improvement has been made by them, may make the affidavit required by law before the officer commanding in the branch or service in which the applicant is engaged.

Where a wife has been divorced from her husband, or deserted, so that she is dependent upon her own resources for support, she can make homestead entry as the head of a family, or as a "*femme sole*."

A single woman who makes a homestead entry, and marries before making proof, does not by her marriage forfeit her right to make proof and receive a patent for the land; provided she does not abandon her residence on the land to reside elsewhere.

Living away from the land for more than six months at any one time is an abandonment of the homestead entry.

Where a homestead settler dies before the consummation of his claim, the widow, or, in case of her death, the heirs may continue settlement or cultivation, and obtain title upon requisite proof at the proper time. If the widow proves up, title passes to her. If she dies before proving up, and the heirs make proof, the title will vest in them. Where both parents die, leaving infant children, the homestead may be sold for cash for the benefit of such children; or residence and cultivation may continue for the prescribed period, when the patent will issue for the children.

In case of the death of a person, after having entered a homestead, the failure of the widow, children or devisee of the deceased to take up residence on the land within six months after the entry, or otherwise to fulfill the demands of the letter of the law as to residence, will not necessarily subject the entry to forfeiture on the ground of abandonment. If the land is cultivated in good faith, the law will be considered as having been substantially complied with.

PRE-EMPTIONS.

A pre-emptor must be the head of a family or a single person over the age of 21 years and a citizen of the United States, or one who has declared his intention to become a citizen, as provided by the naturalization laws.

The settlement must be made in person on public land subject to pre-emption, and not exceeding 160 acres. The settler must inhabit and improve it and erect a dwelling thereon.

No person can acquire any right of pre-emption who is the proprietor of 320 acres of land in any State or Territory, nor who quits or abandons his residence on his own land to reside on the public land in the same State or Territory.

A filing without actual settlement is illegal *ab initio*, although a subsequent bona fide settlement may be recognized if made before the intervention of a valid adverse claim, if duly followed up.

The Government requires six months of actual residence, before proof and payment, and then proof of compliance with law in all respects must be sufficient and satisfactory. If the land is unoffered, proof and payment may be made within thirty-three months from date of settlement, or, in case of unsurveyed lands, from date of filing plat of survey in the District office. This land cost ordinarily \$1.25 per acre and \$2.50 within railroad limits.

TIMBER CULTURE.

The persons authorized to make timber culture entries are heads of families, or single persons who have attained the age of 21 years, and are citizens of the United States, or have declared their intention to become such and have made no previous entry under the timber culture laws.

Entries are restricted to 160 acres in a compact body of land. The land must be devoid of timber. The removal of the natural growth of timber will not render land subject to timber-culture entry. Five acres on a quarter section must be broken or plowed the first year, and five acres the second year. The second year the first five acres must be cultivated to crop or otherwise. The third year the second five acres must be cultivated to crop or otherwise, and the first five acres must be planted in timber, seeds or cuttings. The fourth year the second five acres must be planted in timber, seeds or cuttings. Ten acres are thus to be plowed, planted and cultivated on a quarter section, and the same proportion when less than a quarter section is entered. The whole ten acres, or the due proportion thereof, must be prepared and planted within four years from date of entry. Where the land will not produce trees without irrigation, the land must be irrigated and trees kept watered. Final proof cannot be made until the expiration of eight years from date of entry.

DESERT LANDS

Lands that will not without artificial irrigation produce some agricultural crops, are regarded as desert lands. The amount of land entered by one person cannot exceed 320 acres, which must be in a compact body. Only one entry to each person is allowed. Desert land entries are not assignable. The cost of desert land is \$1.25 per acre, 25 cents at entry, balance at final proof; or \$2.50 within railroad limits, 50 cents at entry, balance at final proof. The entry man must have personal knowledge of the land he enters.

Persons making desert land entries must acquire a clear right to the use of sufficient water to irrigate the whole of the land. The whole tract, and each legal subdivision, must be actually irrigated. The object of this law is to redeem the unproductive lands, and make them highly productive by artificial irrigation.

MINERAL LANDS.

The lands coming under this head may be located in amounts not to exceed 1500 feet long by 600 feet wide, in any one location. There are no restrictions as to how many mineral locations a person may make.

In proceeding to patent this land, the cost of the land is \$5 per acre, but it may be developed and worked without proceeding further than the due recording of the location.

The General Land Office at Washington will furnish information to persons unacquainted with any of the features appertaining to the acquisition of the public lands.

THE CLIMATE OF SOUTHERN ARIZONA.

The following is from the pen of Dr. John Traill Green, of Tucson:

UNTIL a few months ago the medical profession were almost unanimous in the opinion that the climatic treatment was (excepting in rare cases) the only successful treatment of tuberculosis. Within this time the experiments of Koch and Shurly have opened a new field, but while we await their results it seems proper that some facts in regard to Southern Arizona should be added to the literature of climatology. Our Territory has advanced far enough to offer all requisite accommodations and comforts to the weakest invalid, but its chief charm is that it has NOT advanced enough to have the fresh air of its cities polluted by the exhalations from all classes of diseased humanity, nor its low adobe houses, with their high ceilings, transformed into lofty, crowded hotels, every room in which has been poisoned by deadly germs.

In describing our climate four general divisions seem necessary:

1. The humidity of the atmosphere.
2. The rarity of the atmosphere.
3. The temperature.
4. Irritating elements that may be detrimental.

I. THE HUMIDITY OF THE ATMOSPHERE.

The dryness of a climate depends on, (a) the amount of rainfall, (b) the amount of dew, (c) the rapidity of evaporation, (d) the porosity of the soil.

The U. S. Signal Service report of the rainfall at Tucson, covering nearly twenty years, is as follows:

Latitude 32 deg. 14 min., longitude 110 deg. 52 min; altitude 2390 feet.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
.71	.85	.69	.26	.07	.08	2.90	2.74	1.21	.34	.49	.99

Yearly average, 11.46 inches.

It must not be forgotten that an estimate of climatic "dryness" can not be formed from a study of the rainfall alone.

A minimum fall in an atmosphere in which there is but slight evaporation, or in a region where there is almost no porosity of the

soil, would make a climate decidedly "damp." In our rainy season evaporation is so rapid and soil porosity so great that almost as soon as a storm ceases the atmosphere has gained its normal dry, clear state. For this reason fogs are almost unknown, and only in the latter part of our summer season, after an exceptionally large rainfall, is the slightest dew perceptible.

2. THE RARITY OF THE ATMOSPHERE.

Atmospheric rarity is so closely connected with altitude that feet above sea-level almost convey to the close observer the state of the air. And yet it must not be forgotten that rare air is not always dry air; nor is it cold air. At an altitude of 10,000 feet in the Santa Catalina mountains, where every symptom of the rarity of the atmosphere is felt on exertion, the wild strawberries bloom in the summer on the same spot that, in the winter, is covered with snow. Again, when the clouds hang low over the mountains, this same rare air is saturated with moisture and the mountains covered for days with dense fog. This is not frequent and at lower altitudes soil porosity and evaporation prevent it, and the foot-hills are as dry and clear as the valleys and mesas.

3. THE TEMPERATURE.

The following is the Signal Service report for the year 1889, of the climatic conditions at this point (Latitude 32 deg. 14 min., longitude 110 deg. 53 min.):

1889.	Min.	Max.	Mean	Rain	Av. m'n'ly rain since 1876.
January.....	30 0	77	53.5	1.74	.81 inch
February.....	29	82	55.5	1.06	.93 "
March.....	44	81	62.5	1.98	.98 "
April.....	43	95	69	0.18	.18 "
May.....	48	96	72	Trace	.12 "
June.....	57	102	79.5	0.30	.29 "
July.....	66	105	85.5	5.66	2.84 "
August.....	74	104	89	2.06	2.36 "
September.....	51	100	73.5	3.12	1.16 "
October.....	42	95	68	0.36	.64 "
November.....	31.5	82	56	0.32	.55 "
December.....	30.7	76	55.1	1.59	1.29 "
Average, Monthly.....	45.5	91	68.2	.....	.....
Total.....	.....	.....	.....	18.35	12.15 inch

(N. B. This table contains a few more statistics as to rainfall.)

Reference to this table is sufficient to explain nine months of our temperature. The effects of heat are closely connected with humidity

and rarity. The most careless observer need not be told the difference between hot dry air, and hot air loaded with moisture. The state of the latter is best described by the word "sultry," and the feelings that accompany its meaning. Even in the two months when our thermometers climb so high, our atmosphere never becomes sultry nor loses its bracing effects. Our 100's and over are felt less than the 80's of a damper clime.

4. IRRITATING ELEMENTS.

Much has been said of the heat and dust of Arizona, and much exaggerated. Of the heat we have spoken. In the cities of all dry climates there is necessarily much dust at times. In the foot-hills, on the high mesas and in the mountains there is none. The so-called dangerous "dust storms" and "whirlwinds" are novelties of the rarest type and last but a few hours at most.

Many Eastern cities excel us in these phenomena. No attempt will be made to draw conclusions from these few remarks on our climate. Physicians can easily draw their own, and the invalid has but to join us to soon regain the strength to draw one for himself.

AGRICULTURE IN ARIZONA.

THE prospector who has simply passed through Arizona, traveling over the Southern Pacific Railway, is not apt to be favorably impressed with the Territory as a desirable place to locate in to pursue farming as an occupation, and this is especially the case with one not familiar with the peculiar system of farming that must be followed in the arid region, where the rainfall is scanty, the evaporation rapid, and where the absence of forest growth and of green grass will incline the newcomer from the East to believe that the Territory is a barren desert, not adapted to the wants of either man or beast.

The dry sandy plains, the scrubby growth of trees, the few scattered adobe houses, and the occasional crude attempts made by settlers along the line to grow crops, will incline one without a more careful investigation to pass on to a more inviting field.

One cannot help being struck with wonder, however, in seeing at some of the stations small gardens containing a luxuriant growth of vegetables and fruit trees where the soil is irrigated, but so few of such places are found along the railway that they serve rather to make the "desert" more uninviting, than to convince one that the soil is fertile and may be made highly productive.

If the traveler will leave the main line at Maricopa and take the branch to Phoenix, thirty-eight miles distant, he will see a little of what has been done, and may better form some idea of what may be accomplished under a judicious system of agriculture. He will get a glimpse of a few orchards and alfalfa fields, which will convince him that in some things at least Arizona is not surpassed by any other part of the country.

THINGS TO BE CONSIDERED BY THE HOME SEEKER.

First. It should be remembered that the early settlers of the Territory were mining people and range cattle men, and that it is only during the last decade, we might say, that men have turned their attention to agriculture, therefore this industry is still in its early infancy.

Second. Before forming any idea as to the productive capacity of the soil, it should be borne in mind that the existing natural conditions differ so widely from what one is accustomed to in the East, that no just comparison can be made, unless the well-cultivated fields and their yield are contrasted with the fields and crops of the East.

To gain any accurate idea of the value of land in Arizona, it is necessary to get away from the railways, go over the farms that are judiciously worked and irrigated, learn the cost of preparing the soil, putting on water, cultivation, and the yield produced.

It will be found that taking the cost of land and of working, and the yield, that the farming lands of Arizona will compare favorably with the best and highest priced lands of the country.

IRRIGATION.

Lack of rainfall, and necessity for irrigation, is a bugbear to one who has never made a personal investigation of irrigated lands.

Before coming to this part of the country, the writer held the opinion, and this is the common belief with those who have not looked into the matter, that irrigating land to grow crops was so purely an artificial system, and so expensive, and required so much skill, that it was not practicable except on small areas of land, and only for orchards and gardens, where the cost is a matter of no importance,

An examination of the irrigated lands of California, and of Arizona, will satisfy any person that where water may be had, it does not require unusual skill or great expense to provide crops with water.

Having control of water that may be supplied when it is required, and not being subject to rain storms when they are not needed, removes the greatest uncertainty with which the farmer has to contend—droughts and floods.

The growing of a maximum crop becomes a certainty, under judicious management, as the unknown and uncontrollable factor of the weather is eliminated. Farming under such conditions, in this climate, is like operating a factory where everything is under control, and not subject to the uncertainties of the season.

We would suggest to the prospector that he carefully consider the productive capacity of the soil, cost of applying water, yield, market facilities, comfort and health so far as the family is concerned, and cost of living. It will be found that in this climate the early spring vegetables of the East may be had twelve months in the year, and some kind of fresh fruit for nearly the same time, while chickens, eggs, milk and butter, are as easily produced here as in any part of the country, thus reducing the cost of living to the minimum, to say nothing of the luxury of having fresh vegetables and fruits the year around.

AGRICULTURAL DEVELOPMENT OF THE TERRITORY.

The best farming country is not necessarily where everything may be grown, but one that possesses exceptional advantages for the production of certain things, even if these be few in number.

The most desirable spot for a farmer to settle in is one where he may find health and comfort for his family, cheapness of living, and a soil and climate that will produce certain crops with certainty, and at less cost, or of better quality, than they can be grown elsewhere. This is what Arizona offers to the settler to-day. A climate that for health and comfort is not surpassed, a soil that will supply the table at the minimum cost of labor, and a soil and climate, taken together, that will produce certain crops with more certainty, in greater profusion and of better quality than in any other part of the country.

A careful inspection of the comparatively limited area of land now under cultivation in the Territory, that is, limited when referring to the total area that may be cultivated, will convince anyone that the foregoing statement is not overdrawn.

While considering the general adaptability of the Arizona soil and climate for the production of crops, we desire to call attention to the particular crops for which the soil and climate seem to be peculiarly suited, for it is this which gives to the Territory its superior advantages.

In certain parts of the Salt and Gila valleys the citrus fruits grow to even greater perfection than in California, and over a considerable portion of the Territory, where the land may be irrigated, the same may be said of figs, peaches, grapes and other fruits. When to this we add the fact that the season is from two to six weeks earlier than in California, giving to the Arizona fruit grower control of the early and

high-priced markets of the country, and that there can be no competition in early fruits, as no other section of the country can mature fruits and vegetables so early as Arizona, we call attention to *one* of the most promising opportunities offered to the settler for profitable enterprise.

We have equal facilities with California for shipment to market, for hundreds of car loads of green and dried fruits and vegetables have passed through Arizona during the past six months from the Pacific coast to the Eastern markets.

Arizona has a clearer, dryer atmosphere than the Western coast, less rain, no fog, and but few if any cloudy days, which give to Arizona fruits richer flavor and more sweetness than can be secured on the lands west of the mountains, and the dryer atmosphere and absence of rain enables the fruit grower to dry figs, raisins and other fruits in less time and with more certainty and safety.

What has been said in regard to early fruits is true also of early vegetables, which are now shipped in large quantities from the Pacific coast to the East.

SPECIAL CROPS.

Early green fruits, early vegetables, fruits of all kinds, and for all seasons, and dried fruits, are the special crops for which Arizona offers unequalled advantages.

Sugar cane is grown here to a considerable extent by the Mexican ranchmen for a home supply of sugar and molasses, and the cane, with inferior cultivation, equals the tonnage of Louisiana, with a higher percentage of sugar. Tests made in a small way with the sugar beet show as high a per cent of sugar as is produced in the most favored portions of California, so that it may be said that the production of sugar on a large scale may be begun and made profitable as soon as the necessary capital can be secured.

GRAIN CROPS.

Corn, wheat, barley, rye, oats and beans grow and yield as well as in any of the Western States, but beyond supplying the home demand these crops are not of special interest, for the reason that the soil will as readily produce crops of much greater value.

LIVE STOCK.

Arizona embraces a large area of grazing country that is not adapted to the growth of farm crops, on which large droves of cattle and sheep are bred and raised. To make a purely grazing country desirable at the present time it should be near, or readily accessible to, localities where some kind of rich fattening food may be supplied at moderate cost. Cattle must go on the market fully fattened to command good prices.

It would hardly pay to raise corn in Arizona to feed cattle, to compete with the corn-growing cattle feeders of Kansas and other Western States, or with the cotton seed meal fed cattle of Texas. We have, however, a cattle-fattening food that may be supplied at a cost that will enable Arizona cattle feeders to compete with the world, and this is

ALFALFA,

Which grows here in the greatest perfection. In the vicinity of Phoenix are some thousands of acres of alfalfa fields, and on these fields, grazing or feeding on alfalfa hay, thousands of range cattle are now being fattened. Fed nothing but alfalfa, green or cured, a thousand-pound range steer will gain from two to three pounds per day until well fattened, and this gain is equal to that made on good hay and corn in the Mississippi Valley States.

It is possible that adding sorghum hay, or sorghum silage, to the alfalfa would make a still better food, and sorghum grows here to perfection; but up to the present time the ease with which alfalfa may be grown has enabled our cattle feeders to produce a certain gain with less cost for food than is known elsewhere.

The alfalfa seems to last indefinitely on the ground, even when cut for hay two to four times and grazed part of the year besides.

When reserved for hay alone four to six cuttings are made annually and the hay placed in stacks at a cost for labor of less than one dollar per ton.

Just what peculiarities of soil and climate are best for alfalfa is not known, but it is admitted by persons from all sections of the country who have examined the alfalfa fields here that they are unequalled by anything else in the country.

The alfalfa fields may readily be increased to sufficient capacity to fatten all the cattle the range country may be made to supply, and besides furnish food for growing horses, mules, sheep, swine, and dairy herds to supply milk and butter for a large population.

A small farm in Arizona under irrigation will support a family in comfort, as so much may be grown on a limited acreage, and but a short time is required to make an attractive and desirable home. Trees grow with such rapidity that shade may be secured in one or two years, as well as a supply of fruits for the table or for market.

Having traveled over a good deal of the United States for the purpose of studying the agricultural resources and possibilities, I am led to conclude that no section of the country offers a better opportunity to the man of moderate means to establish a desirable home for his family, and there is no place where the industrious man may look for higher remuneration for his labor.

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CULTIVATION OF FRUIT.

THROUGH the courtesy of Mr. H. R. Patrick, of Phoenix, a man of vast experience in fruit culture and fully acquainted with all the systems in vogue in Michigan and California, I am enabled to present the following able article on fruit culture in Arizona:

The southern portion of Arizona has many millions of acres of the most fertile lands known to man, lying in valleys of the Gila and Salt rivers, which is not only fast becoming famous for the production of agricultural products, but has already shown to the practical fruit grower that this section has the elements of climate and soil to make it one of the most perfect horticultural districts on the continent, if not in the world. These statements may startle the Eastern or Western resident who has learned to consider these Southern regions as barren and unproductive. However, I can confidently state that these valleys have been munificently blessed with a harmonious blending of natural elements, combining the climate of Italy, the rich alluvial soils of the Valley of the Nile, the perpetual flow of great rivers from a watershed covering an area of 250,000 square miles that provide water for the artificial irrigation of large areas of now arid lands sufficient in extent to make a small empire that will rival all others in the variety, quality and quantity of productions, both agricultural and horticultural.

To classify these so-called arid lands, it should be said that they consist of river bottom lands, bench lands, and mesa or foot-hill lands, all of which, while possessing many of the same properties, may produce more or less of all the products hereafter named, yet each has its distinct elements that give special adaptation to certain productions.

The nature of the soils of the bottom lands is entirely alluvial, of a very finely powdered consistency, and containing a large proportion of the rich organic detritus that has been washed down from the dense mountain forests and extensive valleys lying far to the north by the great water courses, and dropped as sediment along their winding routes through the level plains of the South, and these same elements of nutrition continue to flow upon these lands in artificial irrigation, maintaining their richness by this perfect mulching of nature.

The subject of artificial irrigation is as old as history, and yet none the less interesting since it is again coming into popular favor as the most advantageous, scientific and profitable system of carrying on cultivation and production. Those who have never studied the methods and process of applying water artificially to the soil, will be interested in a description of a few of the various appliances.

The most common method of irrigation in this country is by means of open canals, ditches, flumes or aqueducts, depending upon the uniformity of the surface to be irrigated and the amount of capital the proprietor may have for perfecting his investment and his conveniences for successfully cultivating his ground.

The main canals in these valleys have been constructed by the aid of plows, scrapers and other modern appliances, such as are used in all classes of earthwork, but the service ditches which conduct the water from the main canals are made by first plowing several furrows with ordinary turning plows, following which a wedge-shaped contrivance made of plank is run through, crowding the earth out on one side at a time, so that by one or two round trips a ditch is made from three to six feet wide, as necessity may require, So level or uniform is the ground that little engineering is needed, save the experienced eye to determine the proper direction to be given these supply ditches to give them the right grade.

The method of surface irrigation for agricultural crops is by means of furrows or ridges run across a field, forming "lands" in an opposite direction, or at an angle with the service ditch so that it can be tapped at each "land" and the water allowed to run until the surface of an entire "land" has been covered, when it is turned into the next in turn.

For garden, orchard and vineyard the service upon the land is effected by small open ditches about one foot in width, or by simple plow or cultivator furrows, according to the amount of water required, an experienced irrigator thus regulating, by the size and number of his furrows, the flow of water, so that there will be no cutting and washing away of soil nor waste of water, no matter what may be the surface slope of the land.

The more modern and improved methods of applying water to the soil artificially, as by pipe or underground conduits of various material and construction, so arranged as to discharge the water at each individual tree, will not be described in detail, though the subject of sub-irrigation is an important and interesting one, but too costly for the needs of this country at the present time.

It no longer remains a question as to the adaptability of the climate and soils of these Southern Arizona deserts, so called, to the production of a wide variety of fruits. The day of tedious and fruitless experiment has passed, and upon this section of country has dawned an era of progress and development that has never been surpassed in any country, so quick and so abundant have been the returns that responded to the hands of the experienced fruit growers who, during the past few years, have ventured into this new and almost unknown land.

In truth we can say that this land has emerged from a cloud, for it has long been considered the domain of the hostile Indian, an entirely erroneous opinion, however, because there actually has not occurred an Indian depredation in these valleys in twelve years. They have always occurred in the mountain districts, and the hostile Apache is guarded on the reservation fully one hundred miles away, and as darkness on a cloudy day is dispelled by the bright rays of a golden sun, so the mantle of obscurity hanging over this truly favored region has been thrust aside by the brilliant success of the golden fruits that are now being transported from our sunny plains to the markets abroad.

It should be distinctly understood that all of the classes of land are adapted to fruit growing in a greater or less degree, so that wherever the settler makes his home he can grow about him a luxuriant orchard, with flowers, fruits, shrubbery and ornamental trees. Yet it is conceded that some particular classes attain perfection on one class of soil and location, as on the bottom lands, while others certainly require the higher altitudes and more porous, gravelly soils that lie near the foothills.

The varieties of fruits that are produced here are many, though some have been started with difficulty and meagre results at first, yet many others show such adaptability that they may be treated as entirely indigenous, so easily are they brought to maturity and so prolific are their products.

The greatest progress and success in fruit growing has been made in Salt River Valley, in the vicinity of Phoenix; but here let it be stated that what may be said especially of that valley it is confidently believed may be asserted of any of the southern valleys of the Territory; other places are following close in her wake, as at Yuma, Mohawk, Gila Bend, Mesa City, Florence, Tucson and the San Pedro valley.

The most common varieties that have been brought to maturity and productiveness are peaches, apricots, nectarines, pears, apples, figs, grapes, quinces, plums, prunes, pomegranates, blackberries, mulberries, strawberries, almonds, olives, oranges and dates. Experiments are going on with other varieties, such as raspberries, cherries, guavas, loquats, persimmons, lemons, limes, bananas, pineapples and others, and from some of these favorable results may be expected, for from a country so new, not only in point of settlement and development, but peculiar in geographical location, climatic conditions, and fertile organic and mineral elements of soil, we can see untold possibilities.

Peaches and apricots lead the line of deciduous fruits for fresh eating, canning, preserving and drying, all varieties yet tried having proven successful. They equal in size, quantity and quality those of

other fruit-producing countries, and ripen from two to four weeks earlier, thus giving Arizona the great advantage of supplying the early market for fresh fruits and escaping the fall rains for drying.

The writer has picked and eaten peaches from the trees in California, Michigan and New Jersey, and nowhere do they excel in fineness of texture, in flavor, in interior and exterior coloring, or in size, those of Salt River Valley; and furthermore, the dried products of peach and apricot of the past two seasons have found a ready market, to the exclusion of imported products.

Only a few varieties of apples have yet proven wholly successful. They are the early June, White Winter Pearmain, Yellow Bellflower and Ben Davis, but these make a clean, shapely tree, prolific bearers, and, though not equal in tartness of flavor to those of northern latitudes, will doubtless supply home demands, the first to ripen being the early June, which comes into market on the first of the month from which it is named.

Though generally shy of a hot country, a few varieties of pears have taken kindly to the bottom and adobe lands of these valleys, the Bartlett leading all, and in fact is very large in size, sweet and delicious, and invariably brings forth encomiums from the connoisseur. The Sickles Early, Flemish Beauty and Winter Nellis are all proving successful and make a good variety for table and market, and more than all the trees are thrifty, free from borers, and the fruit free from worms.

The nectarine, a fruit that is midway between the peach and the plum and makes a pleasant blending of some of the elements of each, attains perfection here also. This fruit should be more cultivated, as it is a delicious table fruit and a very good dryer.

Quinces, plums and pomegranates are all thrifty growers and large producers, and each fills a place in domestic uses. Yet they do not take the place in commerce that is enjoyed by other deciduous fruits. The last named is indigenous, and though not at present recognized as being of commercial value, it must, sooner or later, become an important producer, as its natural constituents contain meritorious curative properties not enjoyed by other fruits, and the root is used with wonderful success in the treatment of pulmonary affections. The tree or bush is an excellent hedge plant for garden and field, growing very rapidly, and is only excelled for ornamental hedges by the Monterey cypress.

The successful culture of the fig is already guaranteed by the dried products, that seem to rival even the foreign importations. All varieties thrive and produce wonderfully, making large-sized trees and maturing three crops per annum. The fruit begins to ripen about the

middle of April and closes as late as the middle of December, the black and brown varieties proving best for table use and the white for drying. The White Adriatic is now taking the lead, the trees bearing a profitable crop the third year from the cutting.

The growth of the fig tree is phenomenal in this country, the second year making a tree six to eight feet in height and the top spreading out to a diameter of ten to twelve feet, while instances have been known where shoots have made a growth of twelve feet in one year, and the oldest trees in Phoenix are thirty feet high. The beneficial properties of the fig as a mild laxative to the human system are known almost the world over. Besides, it is now used on the table fresh, dried, in pickles, preserves and marmalades, therefore it has an unlimited market.

Perhaps the most important factor of the fruit industry of Southern Arizona is that of the grape, than which none prove more prolific in growth of wood and fruit, nature seeming to have made for these valleys a happy combination of elements that supply all the ingredients and conditions requisite to the perfection of this fruit in all its uses, for the arbor and the table, and equally as favorable for wine making and raisin curing. For the arbor its growth is marvelous, a branch having made the enormous growth of forty feet in one year, though this is exceptional, but twenty to twenty-five feet is common. The table varieties are already well represented in Salt River Valley, and it is sufficient proof of the adaptability of this valley to the production of marketable eating grapes to know that such varieties as the Tokay, Lady Downing, Isabella, Concord, White Malaga, Muscat of Alexandria, and others equal to anything we have known in the East or West, have been produced. They begin to bear the second year, and third year produce a profitable crop, the ripening season running from June 1st to December 15th, there usually being a second crop.

The virtues and advantages of the sunny plains for the production of the raisin cannot be questioned, since the products show for themselves the excellence that may be achieved with proper care in growing the fruit and drying the product, to corroborate which we have also had the testimony of old and experienced vineyardists and raisin makers of California, as well as French experts. The Eastern visitor may be surprised to see the grapevine here grown like a low, heavy-topped bush from three to four feet in height, with a single trunk from two to four inches in diameter, each year the branches or canes being trimmed back to a few inches in length and containing one or two buds. This method of close pruning permits the free cultivation between the rows, which is effected with plows or coarse-toothed cultivators kept constantly at work during the growing period, irrigation being only necessary about once per month. When irrigating, furrows have to be run anew on each side of every row.

The early date at which the first crop ripens makes it possible to dry the raisins in the sun and perfect the first crop before the fall rains can interfere, and when the later crops are dying, with proper care they never need be damaged by rain, since the rains are only light showers, occurring usually at night, and the daytime is so universally warm and cloudless that the morning sun quickly dispels all moisture; furthermore, there are no dews, much less a fog. These conditions, to the experienced fruit grower, are sufficiently convincing of the eminent adaptability of this country to the propagation, growth and health of all varieties of the vine, and to the ready and perfect curing of the raisins.

Wine making has not yet become an established industry in Arizona, but some experiments tried and products put upon the local markets have been so satisfactory as to already induce a number of investors to put out large vineyards for the production of wine exclusively. This industry, however, not only requires the experience in vine culture, but a much more difficult and extended experience in turning the product of the vine into the various brands of wine, which requires a scientific study and manipulation of the grape juice in its virgin state, to create the proper conditions and combinations of body, flavor and bouquet which constitute each particular variety and brand.

Probably no American has attained greater perfection or more distinction in this science than the Hon. J. DeBarth Shorb, of San Gabriel, California, whose fame as a horticulturalist and viticulturist is widespread in this country and abroad, and it is with pride that we point to his testimony, given in most pronounced language after several extended visits of investigations into the early results and final possibilities of this entire section.

I quote extracts from a letter dated July 18, 1888: * * *
 "Horticulturally considered, the Salt River Valley, I believe, excels any other portion of the world known to man. * * * The viticultural possibilities of your section are beyond any man's comprehension. From all the evidences furnished me by the growing vines, I must say here that it is the natural home of the vine."

After commenting on the primitive and crude methods he found in vogue for wine making, he goes on to say: "I directed what should be done with one barrel of so-called white wine, as a matter of experiment, and upon examination of it a few months later, found, as anticipated, it had turned into a sherry of most excellent quality. I have no hesitation in saying that the Phoenix country is the only port and sherry wine country in America, so far known; and with trained judgment in the selection of proper varieties of grapes, adapted to your conditions, wines of the highest commercial value, if scientific methods be substituted for those now in vogue in the manufacturing of wines, will be the inevitable result."

I fully believe that the absolute dryness of our atmosphere is a positive preventative of the dread vine disease, as it is to other fruit destroyers. Of the small fruits the only ones proving successful thus far are the mulberry (a tree), the blackberry and strawberry. While the mulberry acts as though quite indigenous and is one of the earliest fruits, ripening as early as April, the two latter fruits have only recently been found susceptible of propagation and fruitfulness. It is quite significant to say in this connection, it was believed a few years ago, after numerous experiments, that these fruits were a failure in this climate, but further experiment and experience have overcome the difficulties, and strawberries may now be found on our tables almost the entire year, and grown in open air, so remarkable has been the success in the improved methods.

One of our nursery men this summer (1890) has picked from a bed of strawberries containing one-third of an acre, the enormous product of two thousand boxes, containing one pound each. The writer selected from one of these boxes ten berries that measured from one and one-fourth to one and three-fourths of an inch in diameter, and the aggregate weight of the ten berries was five and one-half ounces, or an average of over a half ounce to the berry. Another fruit grower with seven acres of strawberries has made a small fortune; and it is safe to say that the Phœnicians have reveled in eating this fruit as much as any city in the Union. With such wonderful transformation in the success of this exotic fruit, supposed once to be a failure, what may we not expect in the way of results from a long list of fruits now grown in the temperate zone and semi-tropic regions.

Already the success of the orange and olive is assured, a number of the latter trees being now in bearing at Tempe and Florence at the age of five and six years. A cleaner, more beautiful lot of olive trees were never seen, but owing to the lack of knowledge of their propagation and culture, they have not as yet been extensively planted.

The orange tree, better known in California and by many of our recent settlers and investors from that section and from Florida, is being rapidly promoted to the front rank of our horticultural resources, and it is already conceded will be the most important and profitable industry of these valleys. A number of scattering trees put out in gardens, where they have had little or no care, have now come into bearing, and produce an orange of rare merit in color, texture and flavor. In December, 1890, a small meeting of those interested in orange culture was held informally at Phœnix, and oranges from Florida, Sonora, California and Phœnix were had for comparison. There were orange growers present from Florida and California, and it was their unanimous verdict that the Phœnix orange did not suffer from comparison, but, on the contrary, its flavor was pronounced equal to any.

In April, 1889, a small experimental orchard was started by a syndicate, and among other trees were fourteen hundred and eighty-five Washington Navel orange trees. During the first year there was a loss of twenty-seven trees, or less than two per cent, and already this orchard has become the pride of Salt River Valley, for it cannot be surpassed in symmetry, health and luxuriance anywhere, as this fact has already been attested by many orange growers from Florida, Sonora and California. The early date at which oranges ripen, and the perfect freedom from all kinds of scale and insect pests, the summer heat even destroying those that are imported, may yet make these favored spots of Arizona the peer of all citrus producing countries.

The lemon and lime are now grown at Yuma with great ease and excellence, the limes being ready for market by the tenth of September and lemons by the twentieth of the same month. They bear abundantly, a clean, smooth fruit, with thin skin and excellent flavor, and are also free from scale.

From information and present progress of experiments, it is confidently expected that the date, banana and pineapple will be made successful, especially at Yuma and other favored spots.

The only nut yet brought to bearing is the almond, though the walnut is being propagated, and from appearances will probably succeed as well as elsewhere. In Salt River Valley some are already putting out large groves of paper-shell almonds.

We have not space to describe the large orchards and vineyards, amounting to many thousand acres, showing the confidence of investors and fruit growers in this industry, nor even mention special results in fruit growing in each of the many valleys of our Territory, to prove the wonderful growth of trees, vines and shrubs, the many instances of immensely large and luscious looking samples of all the varieties of fruit here mentioned, that have been brought to our notice.

It is not in the size of tree and fruit that we rest our confidence and assurance, but it is in the quality and richness of our products, the freedom from all insect enemies of tree, vine and fruit, and the climatic conditions that lend their aid in making the business of the fresh fruit stand, the canner, the drier, the raisin producer and the wine maker so easy and pleasant and profitable.

In closing this chapter I repeat that what has been said of Salt River Valley is believed to be equally true of the other valleys of Southern Arizona, and have made frequent reference to that section because the fruit industry has there progressed farther, and those who might desire to verify the statements here made, would be well paid to visit that section, where the various methods used in irrigating fruit and preserving the product can be more fully shown than elsewhere.

